JANUARY 18, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Production Men Focus on Mach 3 Manufacturing

Taking aim with a plasma jet spray gun, this operator seals leaks and faults with nearly ionized nickel vapor. The technique is one of many that had to be devised to build a 2000 mph airplane. Others: High temperature welding helps trim distortion and cracking. Special machines hold critical tolerances on sheet steel as thin as this page. Hot sizing holds formed parts to specified shapes. Both x-ray and ultrasonics validate weld and braze quality. See Page 86 for more about the production solutions.

What the Steel Pact Really Cost

Money Will Get Tighter; but It Won't Stall Plans for Inventory Building

The Professional Negotiator Can Help You Trim Labor Contract Costs

Dot Welding Speeds Die Repairs

Tungsten Adds Longer Life, Better Wear Properties to New Alloy

'T-Metal' Challenges Aluminum, Copper

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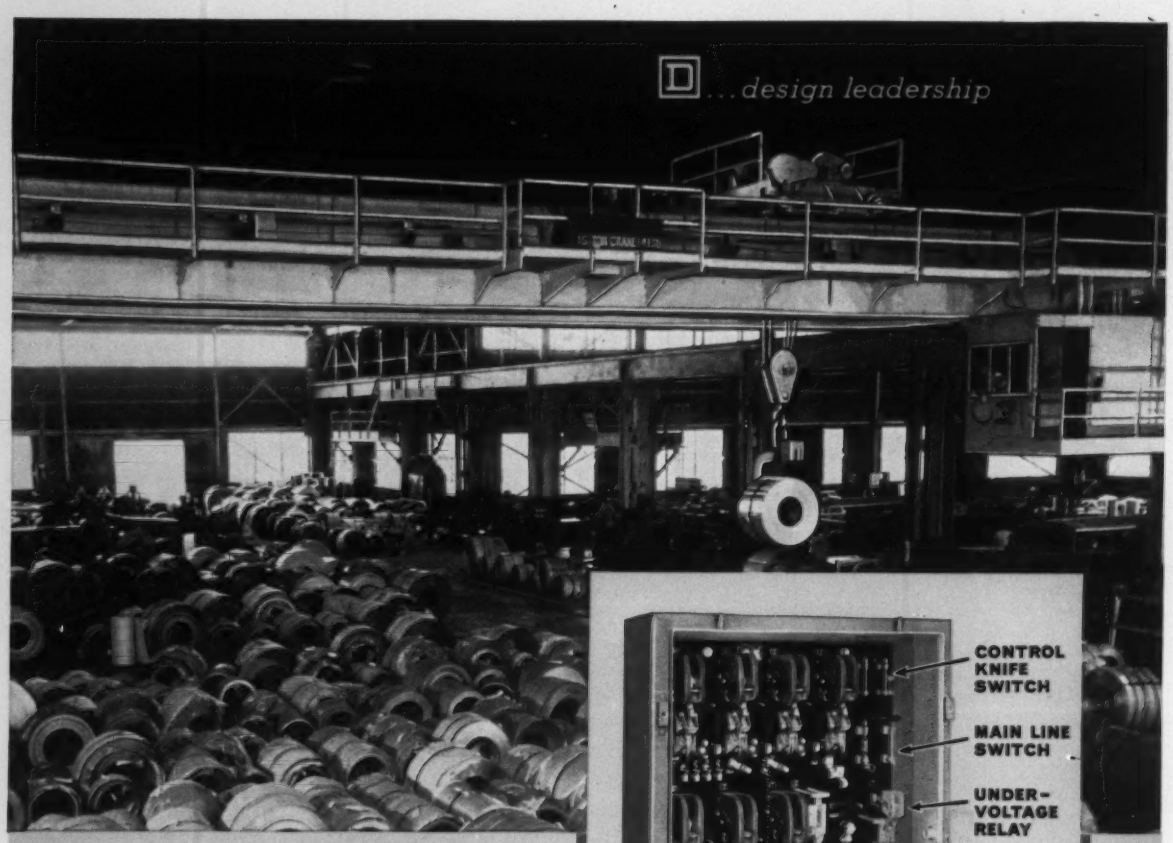

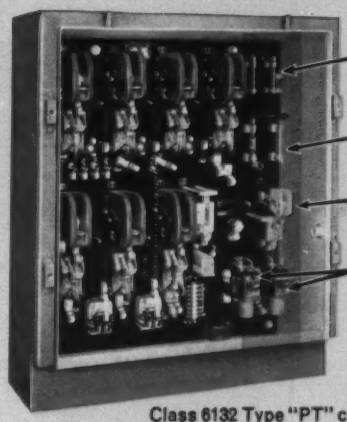

Class 6132 Type "PT" controller with self-contained protection

NOW! LOW-COST MAGNETIC CONTROL FOR DC CRANES

Compact ***EC&M Type "PT" Control*** *—a logical replacement for manual control*

• On any DC crane application up to 55 hp, 230 volts, you now can have all the advantages of *full magnetic* control where manual control formerly was purchased purely on the basis of price. Whether you're modernizing existing cranes or ordering new ones, you'll find type "PT" control far superior to manual control.

Space Saving • compact controllers fit easily in crane cabs, on crane walkways and in congested areas for other mill applications. Front connection permits mounting against walls or girders.

Full Protection • *now* available with self-contained undervoltage and overload protection. Also supplied without protection for use with separate protective panel.

Extra Safety • Exclusive Wright dynamic lowering circuit is the simplest and safest circuit for crane hoist service, gives maximum hook speed without danger of overspeeding. Controller completely enclosed.

Automatic Acceleration • relays adjustable from 0.2 second or more per step. Automatic acceleration reduces wear on motors and control.

Plugging Protection • rectifier-type plugging relay operates from motor counter-emf.

Choice of Master Switches • dynamic lowering controllers furnished with 4-point speed control. Choice of 3 or 4 point master switches on reversing plugging controllers.

Heavy-Duty Construction • mill-type contactors, sturdy design throughout make Type "PT" control suitable for mill accessory drives as well as light industrial cranes. Available in NEMA Type 1 general purpose, Type 1 gasketed, or NEMA Type 3 weatherproof enclosures.

Write for Bulletin 6132 for details on "PT" control with protection

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EC&M DIVISION • CLEVELAND 28, OHIO

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4135

This Week in STEEL

The Metalworking Weekly

January 18, 1960 Vol. 146 No. 3

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Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED JAN. 9	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	181†	168	173	159

†Preliminary.

With sustained power from steel operations and an extra push from the automakers, STEEL's industrial production index soared to a record in the latest period. The preliminary 181 (1947-49=100) was 1 point better than the previous peak set just before Christmas.

Details on Page 71

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED JAN. 16	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	165,000*	161,907†	86,056	134,467

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

Auto producers turned in a 37 month high in the week ended Jan. 9. Considering they worked six days at only a handful of plants, the estimate of a further increase for last week looks like a good bet.

Details on Page 68

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED JAN. 17	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,721*	2,715	2,726	2,111
Index (1947-49=100)	169.4*	169.0	169.7	131.4
Percentage of capacity	95.5*	95.3	96.3	74.6

*Estimated by STEEL; comparative figures reported by AISI.

Steel mills are maintaining operations at a record pace with weekly output only slightly under the all-time high of 2,732,000 tons established in the first week of December, 1959.

Details on Page 118

STEEL SCRAP PRICE COMPOSITE

	JAN. 13	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh Chicago, and eastern Pennsylvania.	$41.67	$41.33	$41.33	$40.33

An advance of $1 a ton on No. 1 heavy melting at Pittsburgh lifted STEEL's composite to $41.67. This is the first change recorded in the composite since early December. It may mark the beginning of a new cycle.

Details on Page 128

FINISHED STEEL PRICE INDEX

	JAN. 12	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	187.0

Steel producers are reviewing their production costs on the basis of the new labor contract. No announcement by major producers is expected until the current studies are completed.

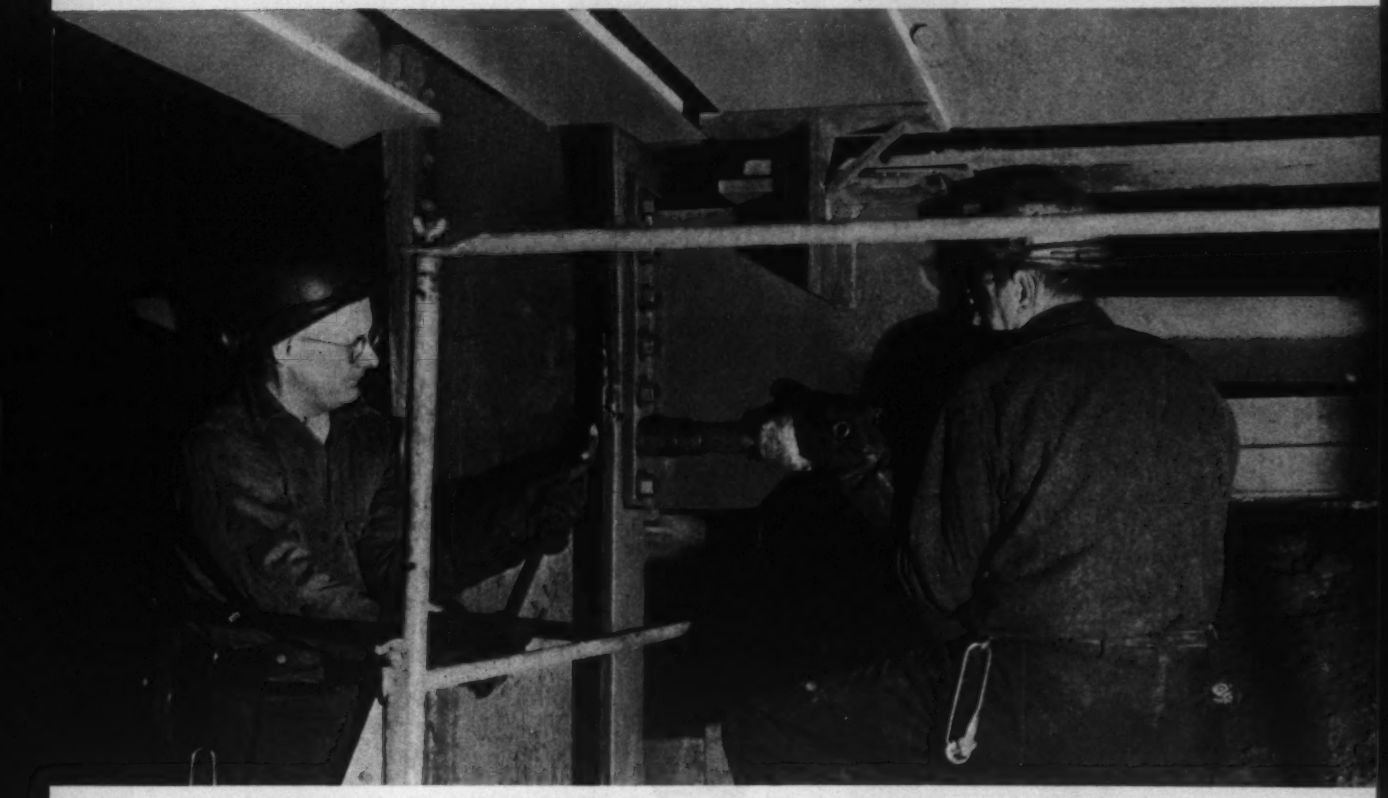
Details on Page 119

Refastening structural members?

TRY HIGH-STRENGTH BOLTS

▲ONE WORKMAN burns off heads of loosened rivets while the other uses an air hammer to drive rivets from holes. Connection steel is cleaned as the rivets are cut loose with the oxy-acetylene torch.

▼TWO-MAN CREW tightens high-strength bolts in rehabilitated structural connection in Bethlehem's No. 2 Open Hearth Building. One man holds spud wrench while his partner uses pre-calibrated torque wrench.



They go in fast, won't loosen.

Back in 1953, we installed high-strength bolts to strengthen the steel framing and crane run in one of our steel plant buildings. It's a tough test, since two 10-ton bridge cranes are in continuous operation. When these cranes start and stop, they set up severe side and lateral stresses on the structural members.

Before the bolts were installed, the riveted joints required frequent repair. But no more. Since 1953, we've checked these high-strength bolts for tightness at least once a year. *Not a single nut has loosened.* Joints stay put. Inspection and maintenance costs are a good deal lower than they used to be.

In addition to savings in maintenance, high-strength bolts offer welcome savings in installation. They go in fast. Try them next time you're refastening structural members. Bethlehem supplies a full size range. Each bolt meets the requirements of ASTM Specification A-325.

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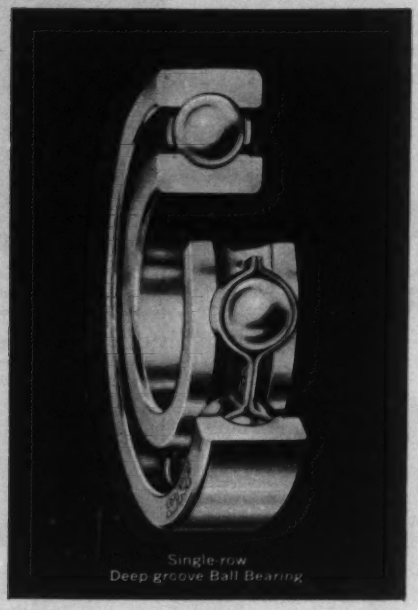


Can a standard bearing offer you "more bearing" for your money?

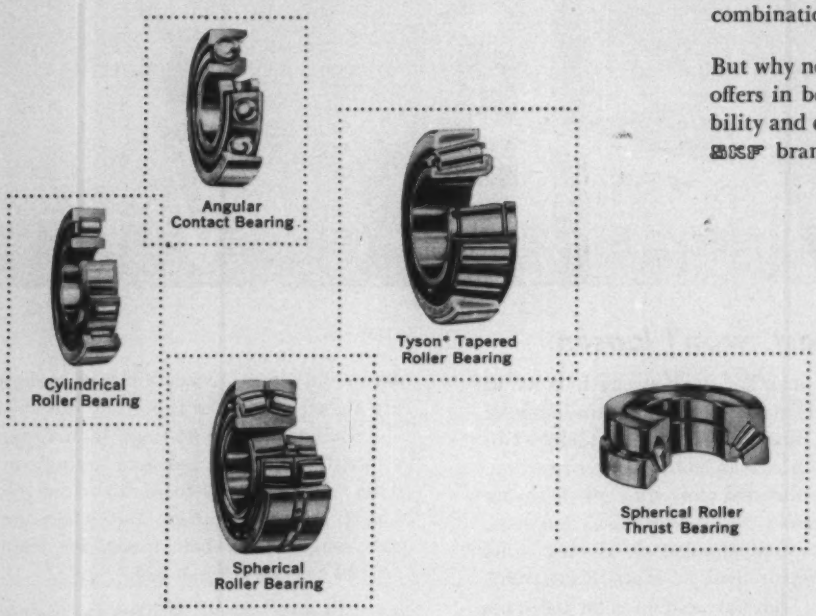
It can if it's made by SKF—because all SKF bearings, both ball and roller, offer special qualities at "production" bearing prices.

Take the single-row deep-groove ball bearing featured here, as an example. SKF designs and builds this type to sustain heavy radial load and thrust load in either direction. Furthermore, it is engineered to run smoothly and quietly at normal speeds with grease lubrication—and at high speeds with oil.

Yet this is a standard SKF ball bearing, mass-produced by automated production equipment at our plant at Altoona, Pa. You can quickly get this bearing in over 100 sizes, ranging from ⅝" to 15.748" O.D., and in a variety of seal, shield and snap-ring combinations.

But why not find out what SKF offers in bearing quality, availability and economy? Just call the SKF branch office nearest you.

6001



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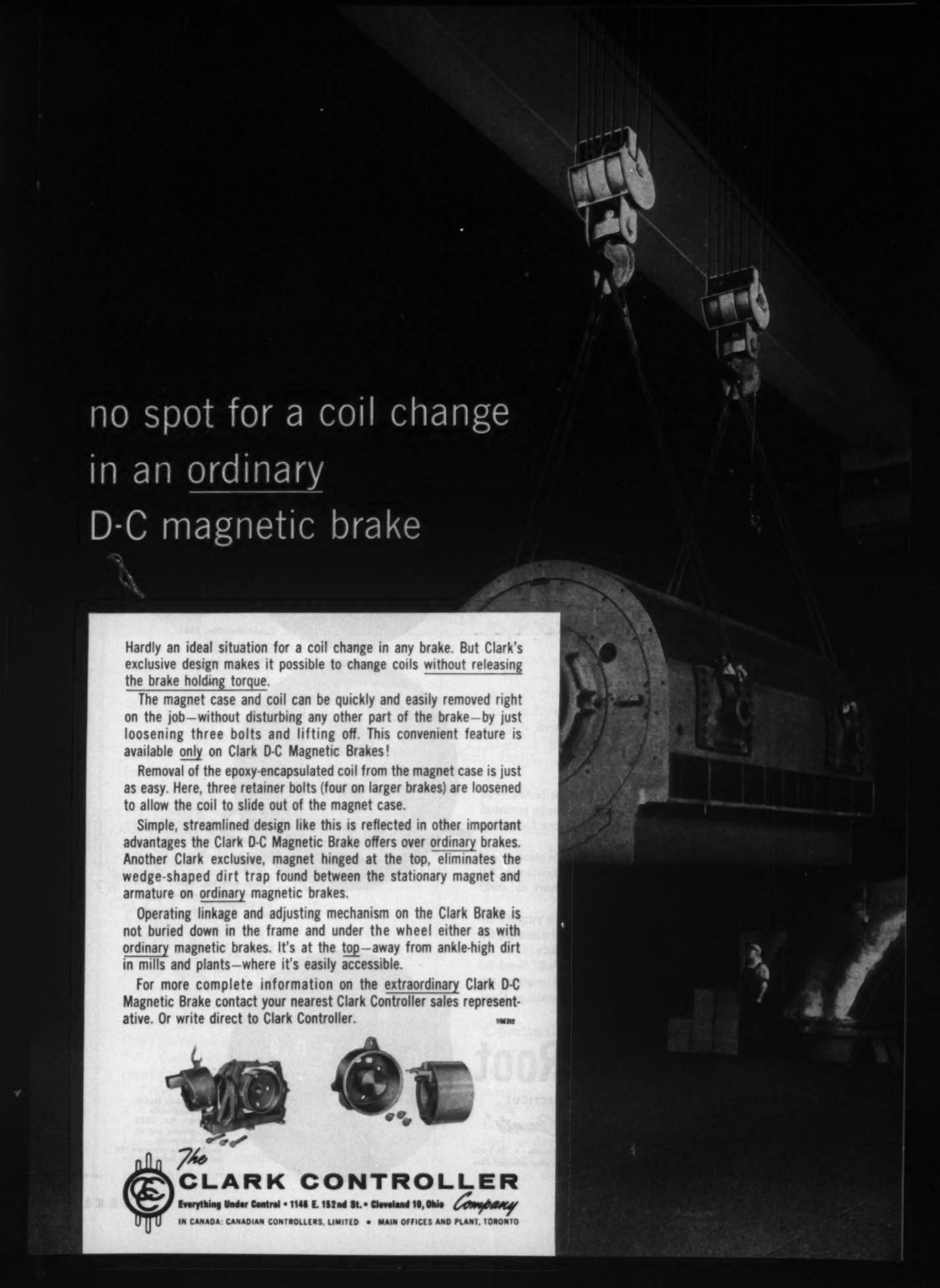

no spot for a coil change in an ordinary D-C magnetic brake

Hardly an ideal situation for a coil change in any brake. But Clark's exclusive design makes it possible to change coils without releasing the brake holding torque.

The magnet case and coil can be quickly and easily removed right on the job—without disturbing any other part of the brake—by just loosening three bolts and lifting off. This convenient feature is available only on Clark D-C Magnetic Brakes!

Removal of the epoxy-encapsulated coil from the magnet case is just as easy. Here, three retainer bolts (four on larger brakes) are loosened to allow the coil to slide out of the magnet case.

Simple, streamlined design like this is reflected in other important advantages the Clark D-C Magnetic Brake offers over ordinary brakes. Another Clark exclusive, magnet hinged at the top, eliminates the wedge-shaped dirt trap found between the stationary magnet and armature on ordinary magnetic brakes.

Operating linkage and adjusting mechanism on the Clark Brake is not buried down in the frame and under the wheel either as with ordinary magnetic brakes. It's at the top—away from ankle-high dirt in mills and plants—where it's easily accessible.

For more complete information on the extraordinary Clark D-C Magnetic Brake contact your nearest Clark Controller sales representative. Or write direct to Clark Controller.

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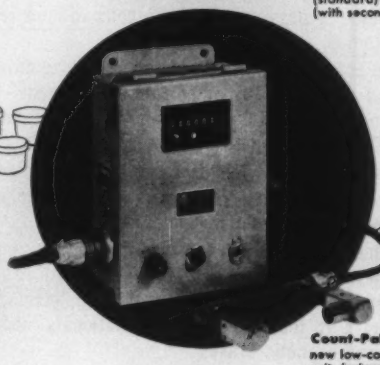

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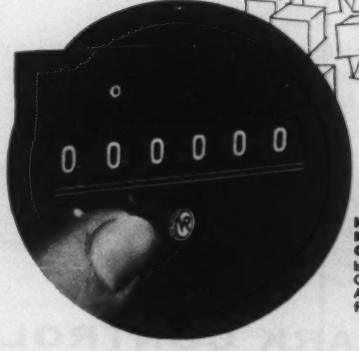

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VR9-33

We Change for the Sixties

The three emblems on the left flank have been laid to rest. At various times since 1953, they have keyed our award winning Program for Management series.

At the head of the 26 articles in the 1960 series, we have a new symbol, a cartoon character bearing banners inscribed: "Production Efficiency" and "Materials Efficiency" —the themes of our current PFM. The new series was formulated about six months ago when a number of editors were mulling over problems in the capital equipment field. In an editorial conference, they discussed their problems, found overlapping interests, and decided to combine their research efforts to develop the series. In our Jan. 4 issue (Page 93) Associate Managing Editor John Morgan laid the groundwork for the series in our think piece, "Production Efficiency—How to Get It." Last week you learned about metalworking's spending plans from Associate Editor George Howick. Next week John Morgan returns to the forefront with the third installation. Here's the gist of it:

The $20 Billion Challenge

In a survey of metalworking buyers, the editors asked: "Assuming you had unlimited funds, what would you spend to keep capital equipment up to date?" The industry's answer: "$20.7 billion." Yet metalworking will spend only $5.65 billion this year.

In an earlier survey, Machine Tool Editor Bob Huber asked machine tool builders which customers were doing a good job of updating equipment. Many replied: "It's difficult to name one—so few are doing a good job." Even many of those nominated disclaimed the accolade, saying: "We don't have a sound expansion and replacement program."

Those are two dimensions of the challenge—a $15 billion deficit and buyer inertia. Along with those two, John will show how companies have failed to modernize and add a third dimension: How the challenge can be viewed as a threat to American markets.

Watch for the man with the banner, we think he's leading an important parade.

More on Chipmaking Disgrace

"The article 'Our Chip Making Inefficiency Is a National Disgrace,' by Horace Frommelt, director Spring Garden Institute, Philadelphia, attracted my interest as a tool salesman," writes W. H. Hughes, service representative, Standard Tool Co., Cleveland.

"On Jan. 18, one of our tool engineers will conduct a tool clinic for 200 men who use cutting tools. In my estimation, this would be excellent literature to pass out to the audience. Are copies available?"

The copies were sent. So far, more than 6000 reprints of the article have been requested by readers.

'The Man Who Came Back'

Little stories often provide insight into a man's character. Here's one about a major metalworking executive, which was sent to us by William F. Horsch, manufacturers' representative in steel and steel products, Grosse Pointe, Mich.

During World War II, Mr. Horsch was officer in charge of steel purchasing for the Navy in Washington. The high volume of his department's invoices for steel precluded meeting the discount dates mentioned in purchase contracts.

"When we discovered that the Navy (in reality the U. S. taxpayer) was losing untold amounts in cash discounts, we called on the steel industry for relief. U. S. Steel sent an attorney from Pittsburgh. When he learned it was impossible to meet the original contract terms, he asked how much time we needed. We told him.

"The attorney said he'd be back. A week later he returned and granted us the terms we asked. Contracts were amended and the loss of discounts (taxpayers' money) was stopped."

STEEL salutes "The Man Who Came Back," Roger M. Blough, now chairman, U. S. Steel. He's one of the men who forms the character of metalworking.

Composite of an Editor

Ed Case, our metallurgical editor, presented these specs for editors at our annual editorial meeting:

He must be a man of vision, drive, and ambition, a before and after dinner speaker, a night owl, a day lark, and be able to drive all night and yet appear strictly fresh the next day. Must learn to sleep on desks and eat two meals a day

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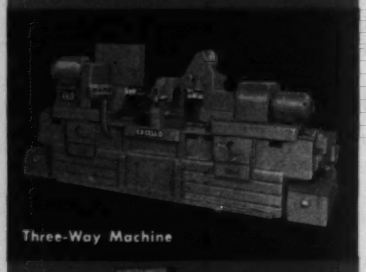

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The Ex-Cell-O Catalog lists a wide range of standard Precision Boring Machines that meet your requirements for accuracy, speed, economy and dependability. Or call your local Ex-Cell-O Representative for details on hydraulic-actuated or cam-operated boring machines, single or double-bridge, horizontal or vertical styles, way-type machines and others in the complete line.

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to economize on traveling expenses.

Must be able to entertain without being too amorous, inhale dust and industrial fumes, slog through 10 ft of snow at 10 below zero, and work all summer without perspiring. He must be a man's man, a ladies' man, a model husband, a fatherly father, a devoted son-in-law, a good provider, hail fellow well met, and be able to shuffle and deal like an expert.

Must attend all editorial training courses, press conferences, plant openings and closings, labor meetings, conventions, regional meetings, product demonstrations, funerals, and births. Must visit news sources in offices, hospitals, and jails.

Needs the curiosity of a cat, the tenacity of a bulldog, the determination of a taxi driver, the diplomacy of a wayward husband, the patience of a self-sacrificing wife, the enthusiasm of a college freshman, the simplicity of a jackass, the assurance of a college senior, and the tireless energy and persistence of a bill collector.

We Were Pleased to Help . . .

. . . Drop Forging Association, Cleveland, define high temperature alloys for its membership. The association is compiling monthly plant reports of orders in the industry as well as shipments by types of metal. To establish standards for reporting and analyzing sales, DFA reproduced 1000 copies of the High Temperature Section of STEEL's Metal Selector and circulated it with report forms.

Where Will Mufflers Go?

The sporty character on the left brings to mind a new concept in automotive design. Though their designs aren't as radical as this one, Detroit's engineers have been kicking around the idea of putting auto mufflers up front. Various facets of muffler laws were explored in our Mirrors of Motordom column, July 13, 1959. R. L. Burton, secretary of the Automotive Exhaust Research Institute, Cleveland, called for caution in considering elimination of the tail pipe. He says the tail pipe's sole function is to protect passengers by channeling carbon monoxide to the rear of the car.

As a follow-up, we asked directors of motor vehicle bureaus in the 50 states for their opinions on the location of exhaust systems. For their reactions, check the Mirrors column in this issue.

Credit Where Credit Is Due

In the Windows of Washington column, Dec. 21, we forgot our journalistic manners. *Washington Science Trends*, a publication covering U. S. government scientific developments, gave us permission to reproduce an artist's conception of a jet powered inflatable aircraft. We neglected to credit the source. Our apologies.

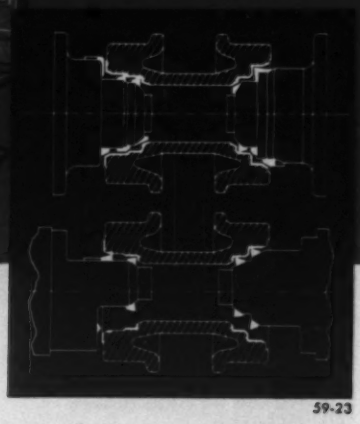
FROM ROUGH...

Heavy boring and
plunge-facing

TO FINISH

Precision boring
and facing

IN ONE MACHINING CYCLE



59-23

Ex-Cell-O Custom Machine—with quick-change tooling—speeds output of large, cast-iron track rollers

This Ex-Cell-O Custom Machine features precision—in a big way.

A track roller for rugged, off-the-road equipment, is clamped in the hydraulically-actuated fixture; the rest—from rough to finish—is automatic.

The part is first rough-bored on both ends at the same time. Then both slides retract and the fixture indexes into position for finish boring and facing at both ends, simultaneously. (Drawing, above-right, shows rough and finish tooling.) Slides again retract and the fixture is unclamped, ready for the next cycle. Easily changed tooling heads and clamping jaws permit precision machining of any of three similar components with minimum lag in production.

See your Ex-Cell-O Representative, or write direct for full details on Ex-Cell-O Custom Machines—specially designed with extended capacity for changing production needs.

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8. Welding and Joining Equipment and Supplies
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Exhibitors at the Philadelphia Metal Show will gather their customers and prospects from the broad metalworking industry, including automotive, aircraft, appliance, ordnance, farm machinery, electrical machinery, instruments, and miscellaneous metalworking manufacturers . . . creating a thriving, effective, profitable marketplace. If your potential for sales lies in any of these areas, the Metal Show should take priority in your sales plan for maximum impact in the Soaring Sixties.

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Steel, the sinew that binds the strength of America, will serve as a magnetic attraction to call attention to **every** area of metals technology, ferrous and nonferrous, at the most metallic of all Metal Shows — the 1960 Philadelphia Metal Show, now blue-printed and ready to grow into its full dimensions. This new emphasis on the essential metals of industry reflects a growing specialization . . . a **focusing** of attention . . . to yield a greater benefit. In the evolution of the Metal Show, the time for such refinement has come. Now it is possible to achieve a concentration on **materials** that is unsurpassed anywhere for an intensive person-to-person interchange of information. The STEEL ARENA is the threshold to a whole new world of metals within the exhibits and technical sessions. The pre-eminence of a Metal Show of these dimensions is worth your closest consideration as an exhibitor — you are invited to share its benefit in any of the eleven areas of metals listed.

MAKE PLANS NOW TO EXHIBIT AT THIS GREATEST OF ALL METAL SHOWS!

AMERICAN SOCIETY FOR METALS

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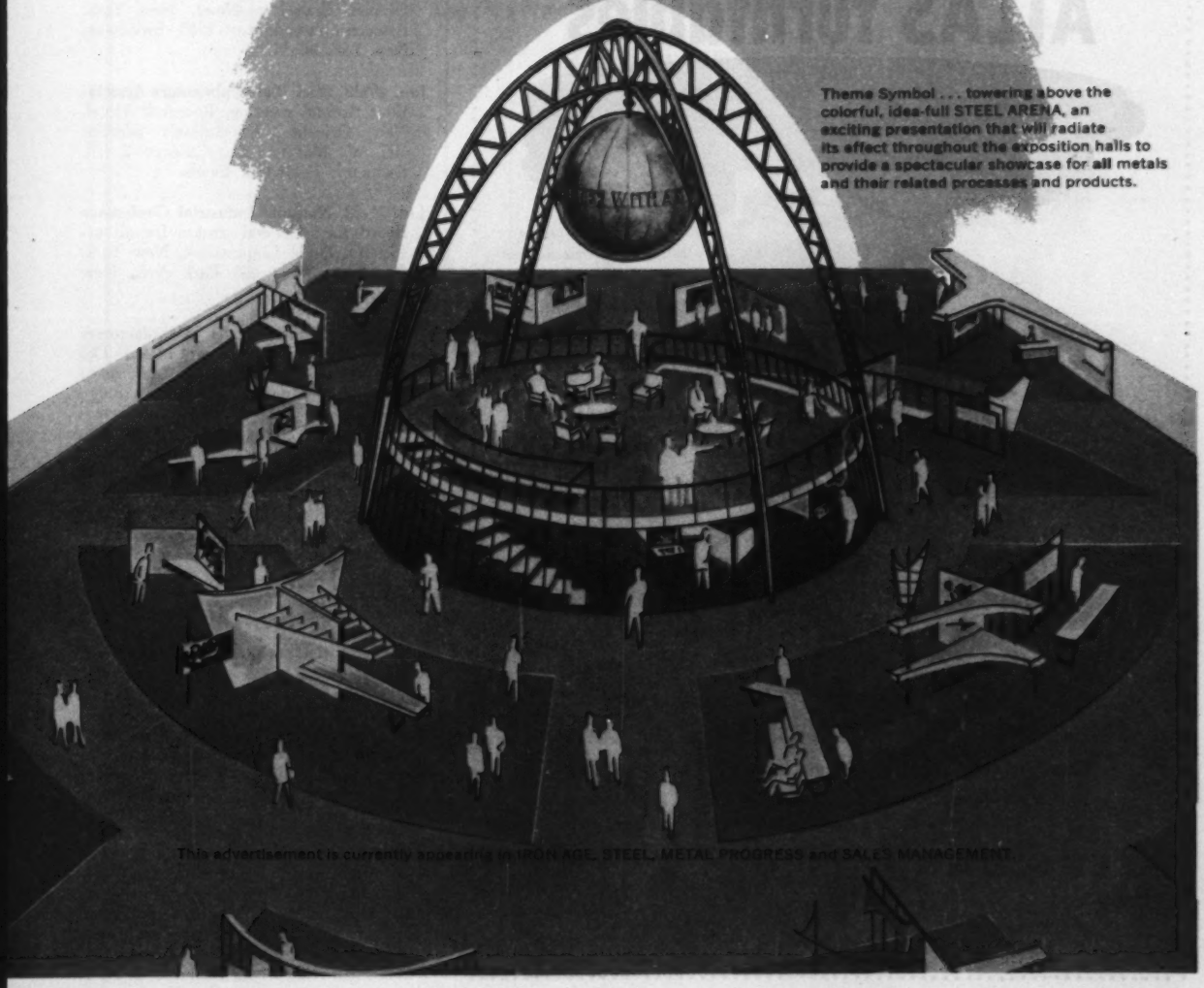
. . . a benefit to every exhibitor

METAL SHOW



Theme Symbol . . . towering above the colorful, idea-full STEEL ARENA, an exciting presentation that will radiate its effect throughout the exposition halls to provide a spectacular showcase for all metals and their related processes and products.

This advertisement is currently appearing in IRON AGE, STEEL, METAL PROGRESS and SALES MANAGEMENT

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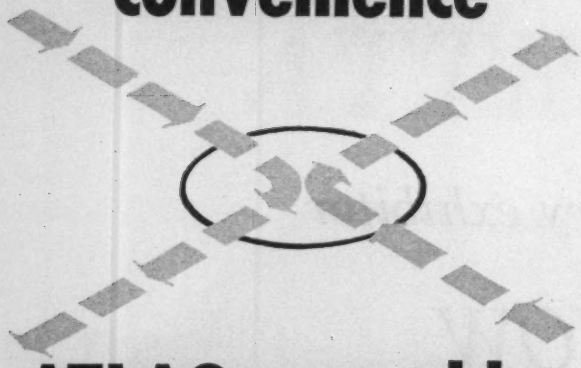
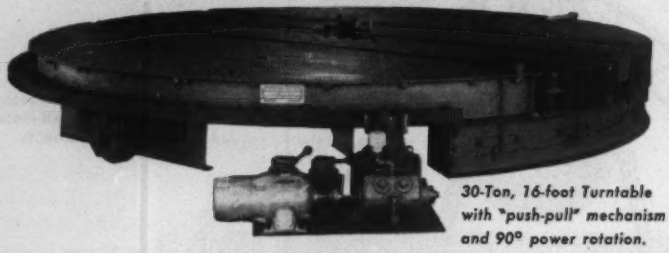
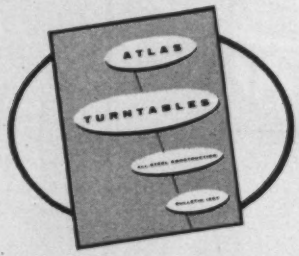


ATLAS turntables



30-Ton, 16-foot Turntable with "push-pull" mechanism and 90° power rotation.

Atlas turntables are made to customer specifications in any size and capacity; for manual or power rotation. Either flush or raised rail arrangement can be provided, with rail size and gauge to match existing track.

Request 

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CALENDAR
OF MEETINGS

Jan. 18-19, Industrial Heating Equipment Association: Annual meeting, Warwick Hotel, Philadelphia. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 18-21, American Road Builders Association: Annual convention and highway materials and services exhibit, Netherland-Hilton Hotel, Cincinnati. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: L. W. Prentiss.

Jan. 19-20, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 20-22, American Management Association: Research and development conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 20-22, Steel Plate Fabricators Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 105 W. Madison St., Chicago 2, Ill. Secretary: J. Dwight Evans.

Jan. 21-22, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y.

Jan. 24-27, Truck-Trailer Manufacturers Association: Annual convention, Del Coronado Hotel, Coronado, Calif. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 24-28, Associated Equipment Distributors: Annual meeting and exhibit, Conrad-Hilton Hotel, Chicago. Association's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Herman.

Jan. 25-27, American Management Association: International management conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 25-28, Plant Maintenance & Engineering Conference and Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 314 Madison Ave., New York 17, N. Y.

Jan. 26-27, Society of Vacuum Coaters: Winter meeting and technical conference, Hotel Biltmore, New York. Information: John H. Smith, Application Engineer, Technical Services Dept., Consolidated Electrodynamics Corp., 1775 Mt. Read Blvd., Rochester 3, N. Y.

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with the installation of a

Availing themselves of SECO's facilities for custom building efficient slitting lines, the Detroit Steel Corporation, Detroit, Michigan, just recently installed this 60" Seco Slitting Line thereby assuring predictable performance. The entire unit, consisting of a cone-type Uncoiler, Slitter and Recoiler, was specifically designed and built by SECO for this customer.

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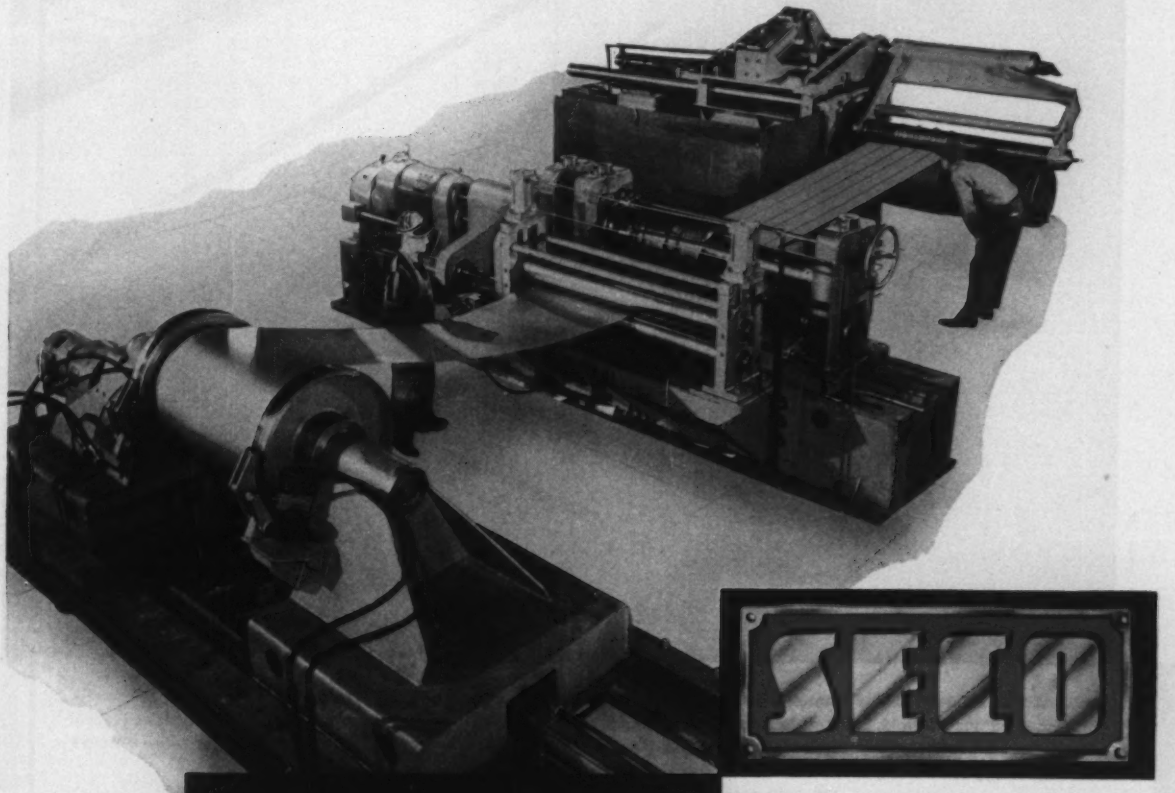

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Profit-producing ideas for the manufacturer . . .

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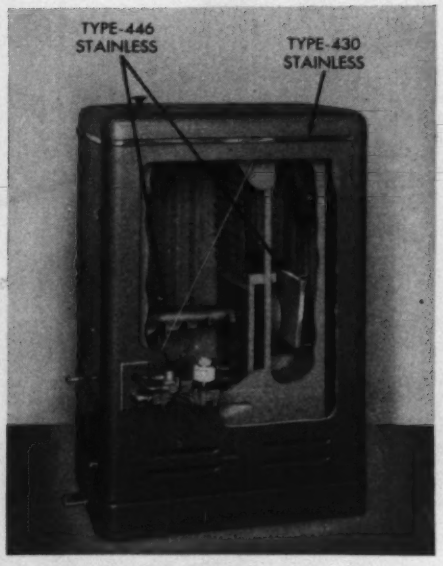

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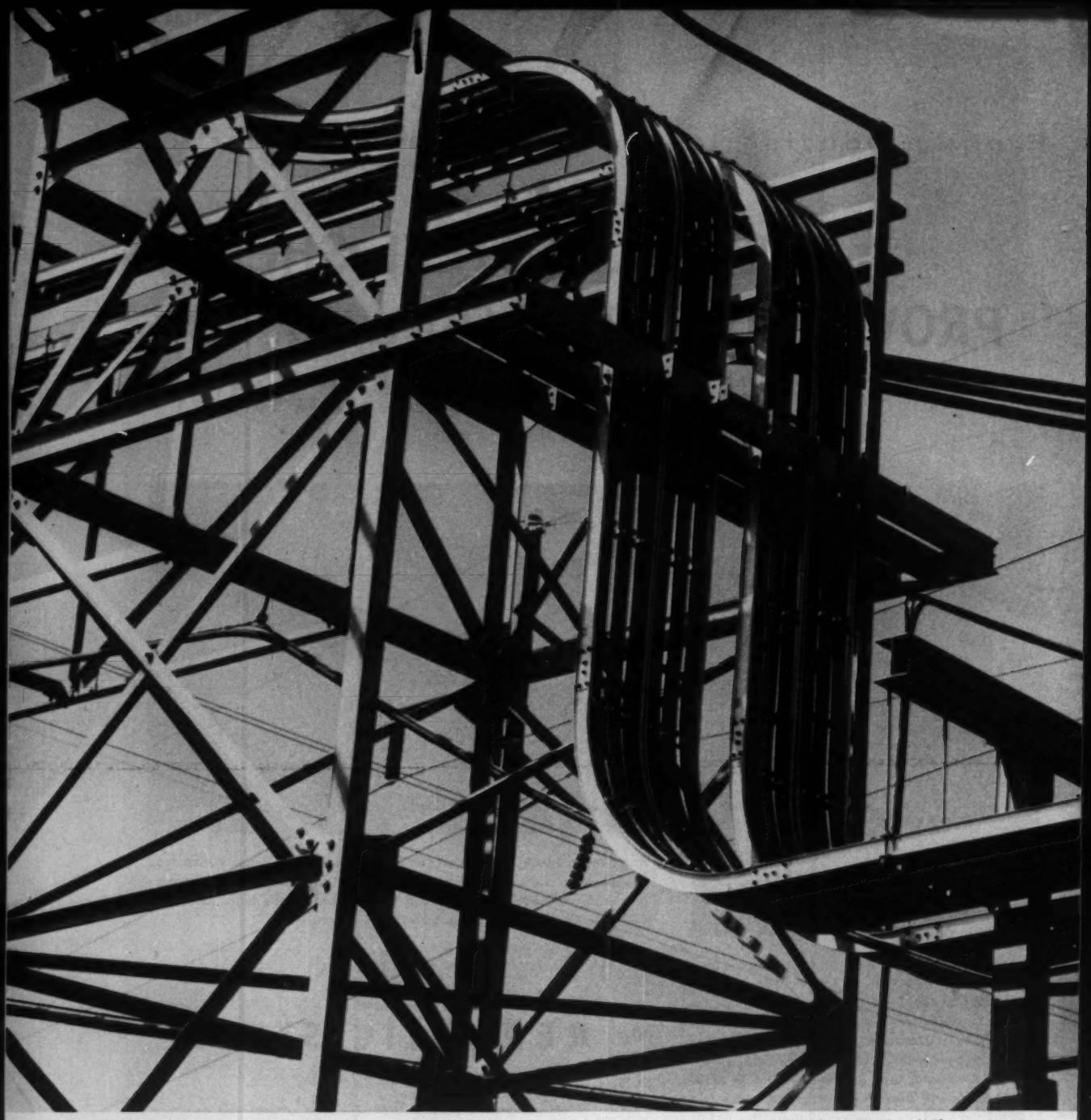

Indoors or out, rugged Anaconda Duralox means fast, easy installation because it needs no rigid conduit. Its reliable Anaconda Butyl (AB) rubber insulation

PROBLEM:

Installing high-voltage cable without rigid conduit

SOLUTION:

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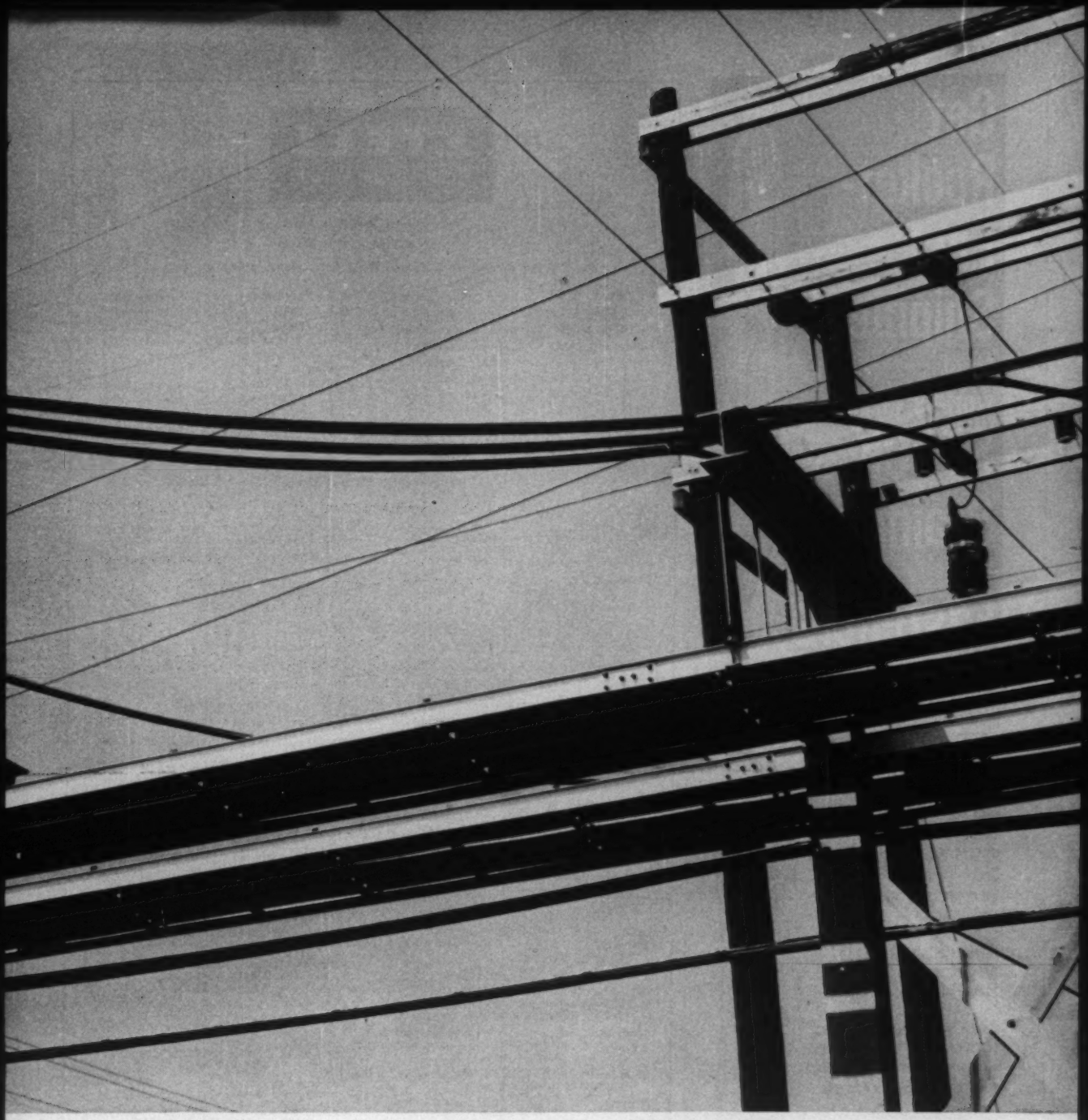

offers extra protection against ozone and moisture. Above is an installation of Duralox with thermoplastic protective jacket over interlocked armor.

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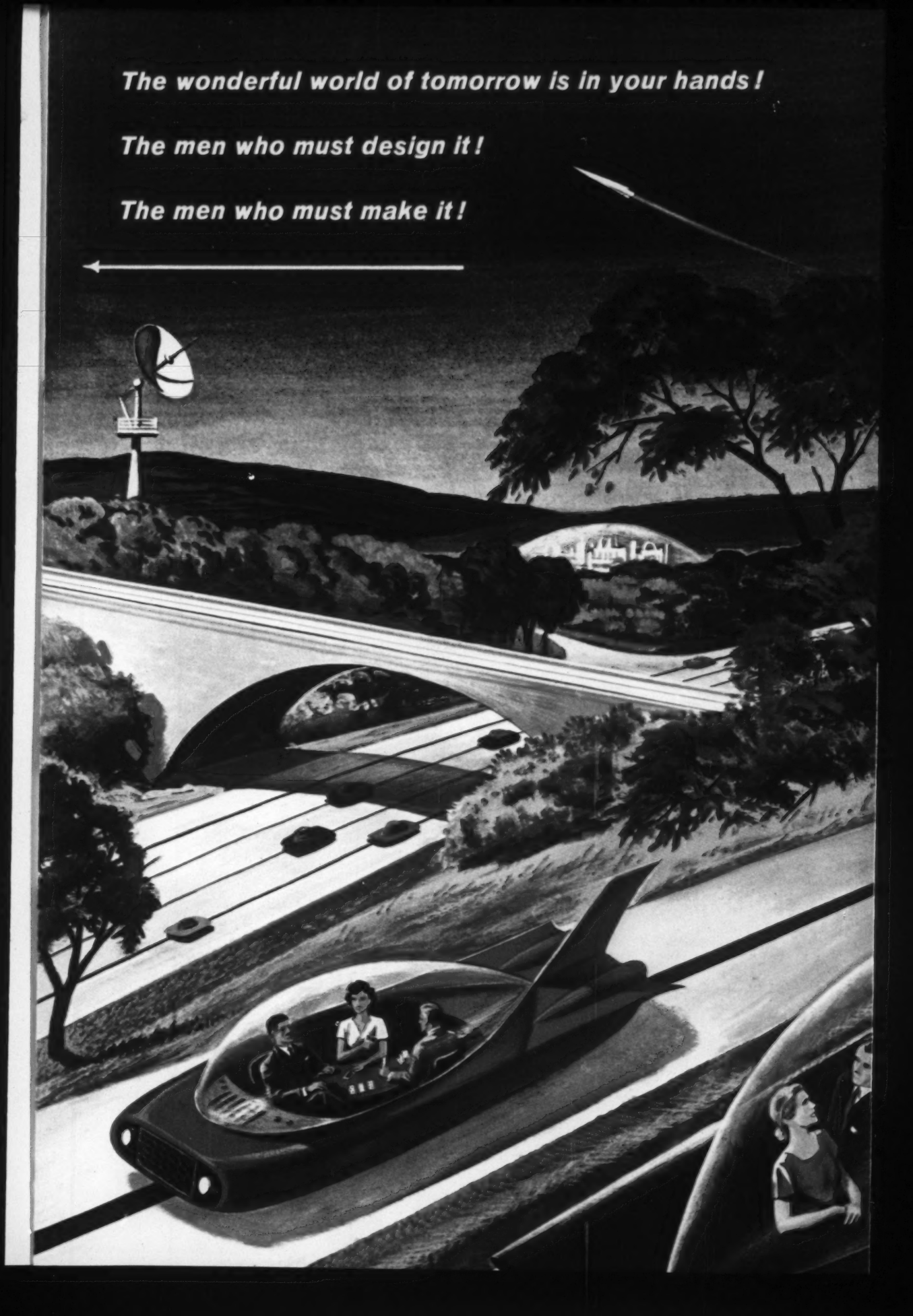
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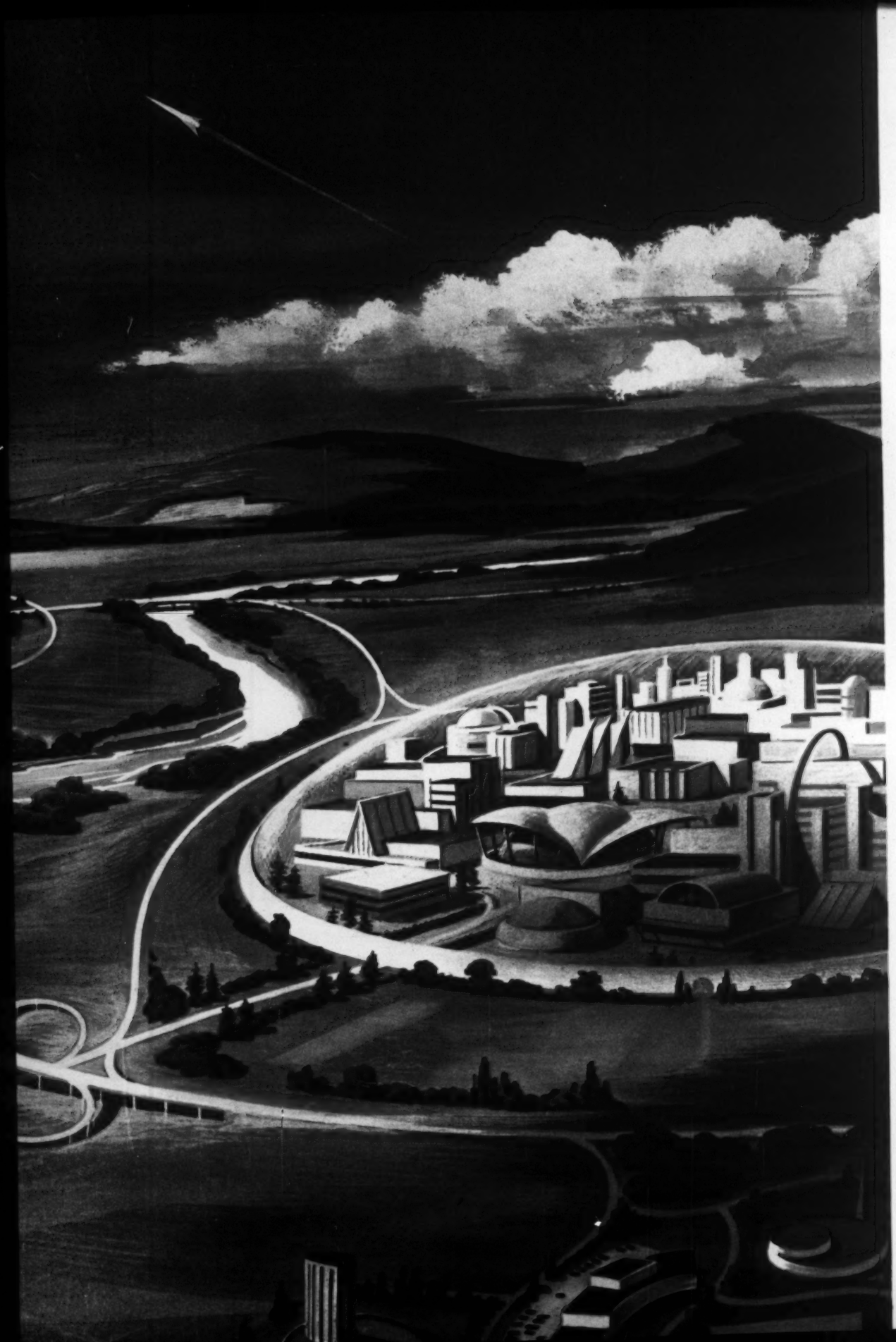

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- **A 6500 ton briquetting press for Titanium Metals Corporation of America.**
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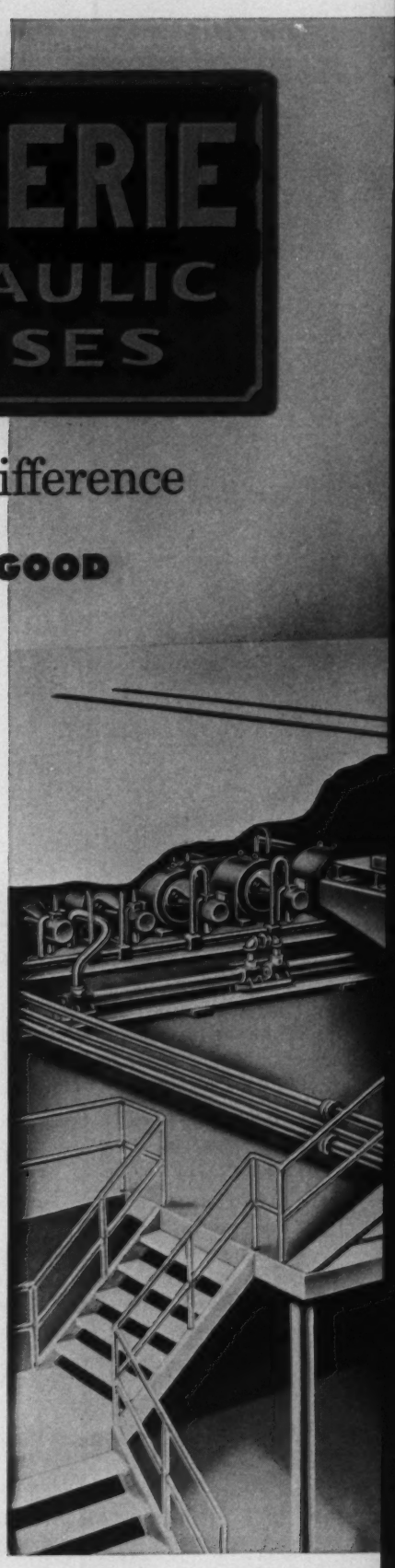
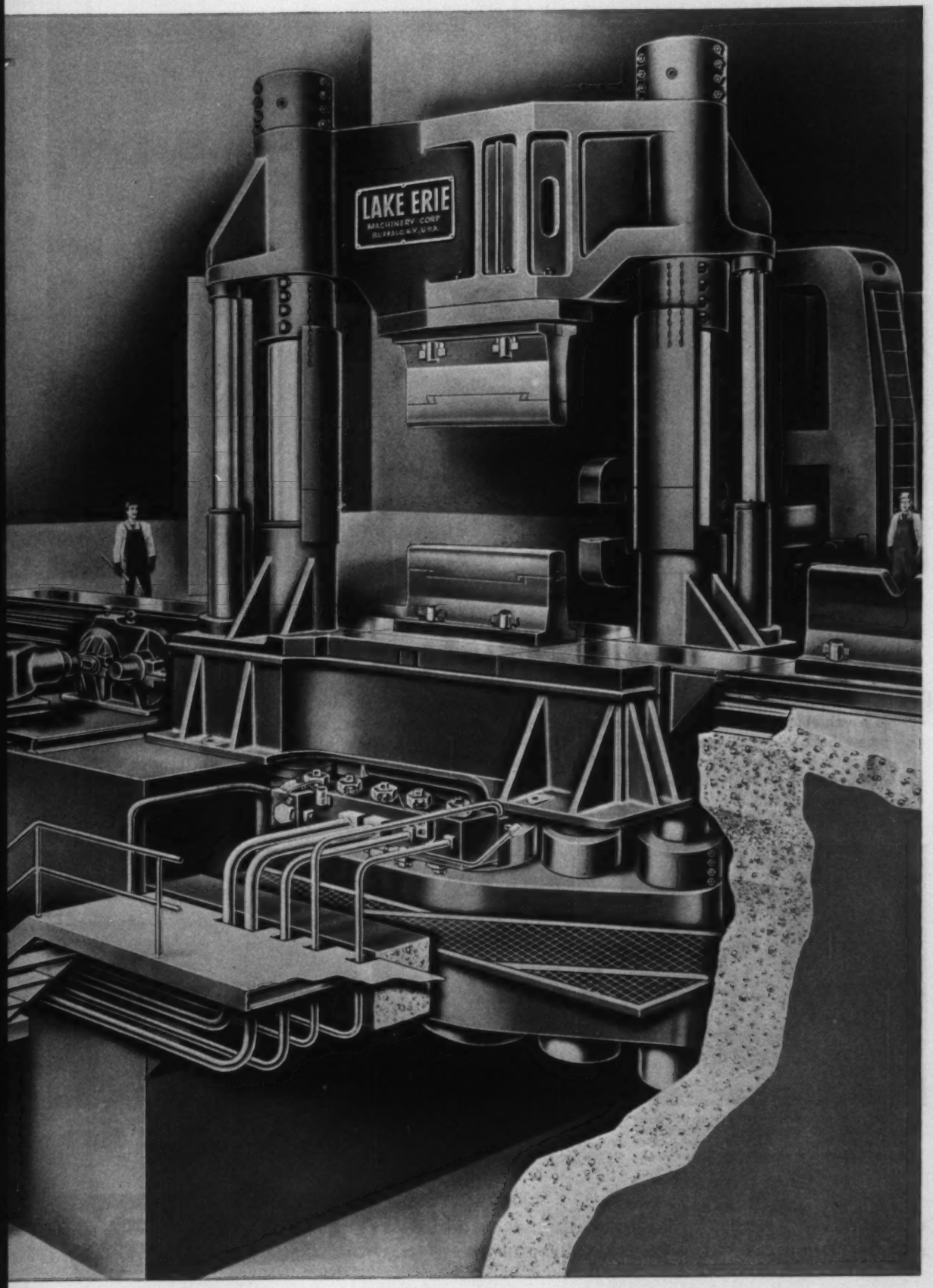


ARTIST CONCEPTION of the unusual 2000 ton Allegheny Ludlum forging press which is currently operating three shifts a day. It is impossible to illustrate this press photographically because it extends through the floor.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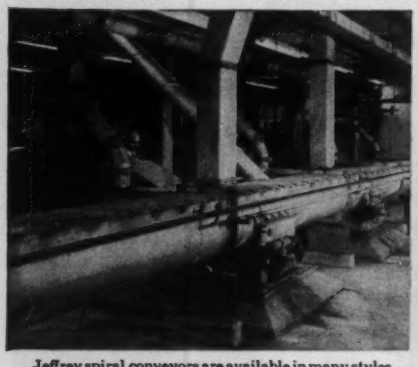
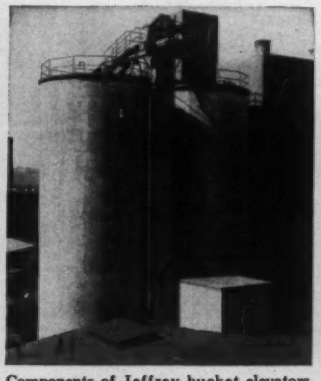
Efficient, dependable Jeffrey conveying equipment is a valuable antidote for rising costs in processes where bulk materials must be moved. PERMASEAL® idlers on these conveyors mean years of usage without greasing—contribute to lower operating and maintenance costs.

Jeffrey products are available through distributors in principal cities. You'll find these men *production-conscious*, ready and willing to advise on your conveying needs. For this help, see them or write The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.



Jeffrey spiral conveyors are available in many styles for moving dry, bulk materials. Compact, they occupy minimum space. Convenient, they can be fed or discharged at any point along their length.



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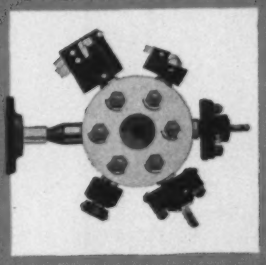
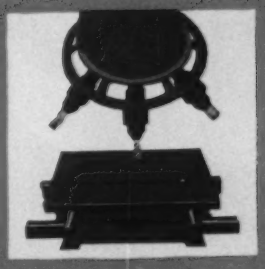
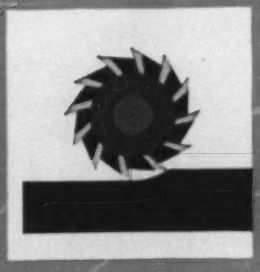
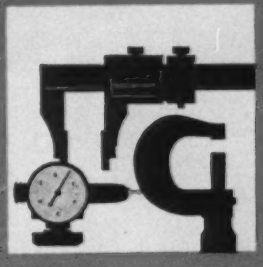
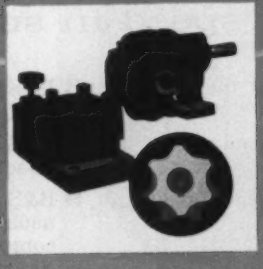






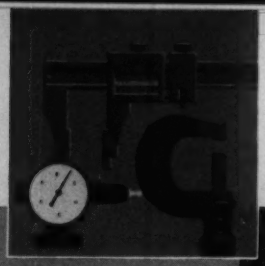




Brown & Sharpe

PRECISION CENTER

TO HELP YOU MAKE PRECISION MEASUREMENTS EASIER AND FASTER . . .



8 Brown & Sharpe tools bring you unusual new precision and speed in surface plate work

1 B&S Black Granite Surface Plate is the flattest, most indestructible base you can buy.

2 Hite-Set® establishes heights fast and easily in ten-thousandths.

3 Dial-equipped Hite-Icator® works even faster to provide the same accuracy.

4 Hite-Chek® transfers measurements without losing a single ten-thousandth. It is "chatterproof."

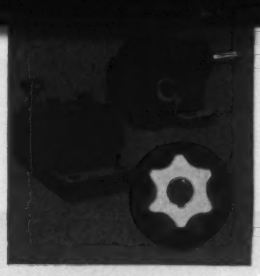
5 Super Hite-Chek works even finer; in 25 millionths and better. It's transistorized; a snap to use.

6 B&S 9" Riser Blocks, made to gage block accuracy, stack under other tools in measuring tall work.

7 B&S Direct Reading Cylindrical Square shows out-of-squareness directly in 2 ten-thousandths.

8 B&S Inspection Sine Plate sets angles with unusual precision. Available in 5" and 10" simple and compound models. Ask your Brown & Sharpe distributor to show you the complete line of accurate B&S surface plate tools. Brown & Sharpe Mfg. Co., Providence 1, R. I.

Brown & Sharpe PRECISION CENTER



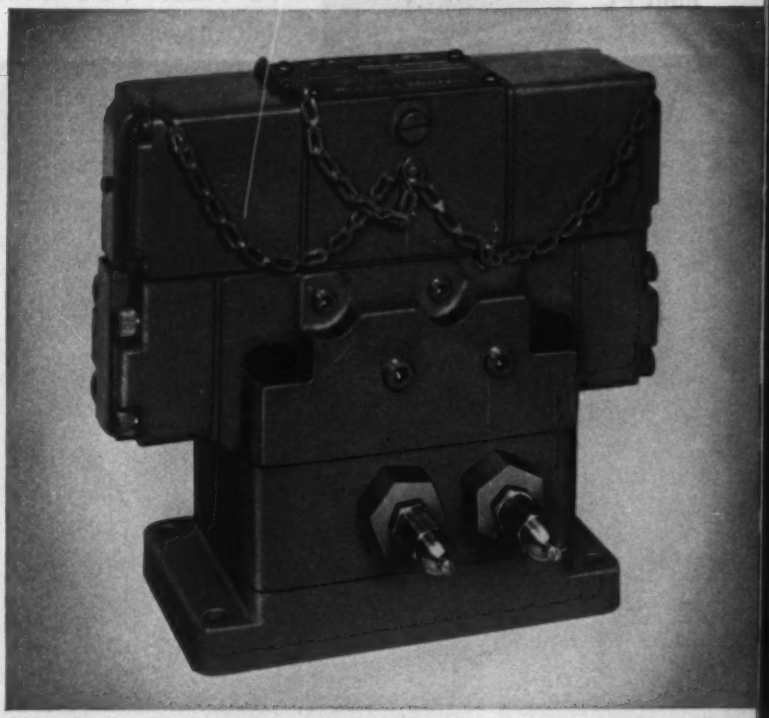
TO HELP YOU HANDLE FLUIDS
MORE EFFICIENTLY... AND FOR LESS

Save up to 75% on valve installations with new Double A "Circuit-Stak"

Circuit-Stak valves are a new Brown & Sharpe concept: a "sandwich" of several valves required for a hydraulic circuit, assembled in one compact unit on a single sub plate.

You save up to 75% of the usual installation cost for separate valves, because Circuit-Stak installs as easily as a single valve — eliminates separate mountings and piping runs. Valves in the sandwich can be easily removed or replaced.

For literature on Double A hydraulic control valves, power units, Gerotor pumps, write Double A Products Co., a subsidiary of Brown & Sharpe Mfg. Co., Manchester Michigan.



Above: Simple Circuit-Stak combining double flow control valve, "sandwiched" under 4-way valve, costs about $36 less to install than if valves were separately mounted.

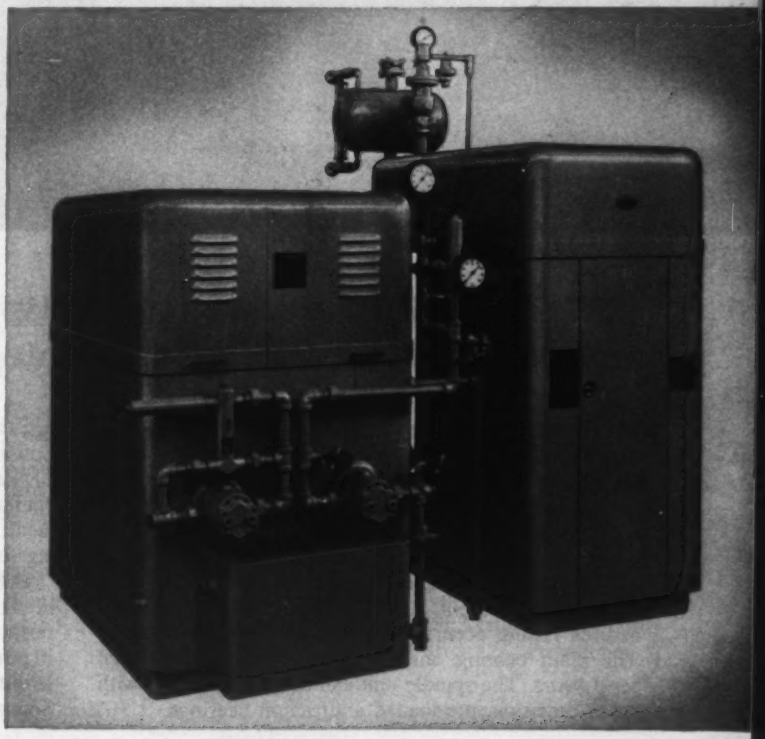
Below: Famous Votator chilling and plasticizing units for shortening and lard are manufactured by Girdler Process Equipment Division, Chemetron Corporation, Louisville, Ky.

Unusually long life of B&S pumps suits them for "Votator" units

The reasons why Brown & Sharpe rotary geared pumps have been built into "Votator" vegetable-shortening and lard processing units for over 15 years, are important to any pump user . .

First, B&S tolerances between moving parts are so close that they reduce slippage of hot oils to an absolute minimum — at 250-300 psi. Second, B&S fine internal finishes assure extra-long service life. Equally important, the B&S pumps that meet Votator requirements so well are *inexpensive* — available right from stock.

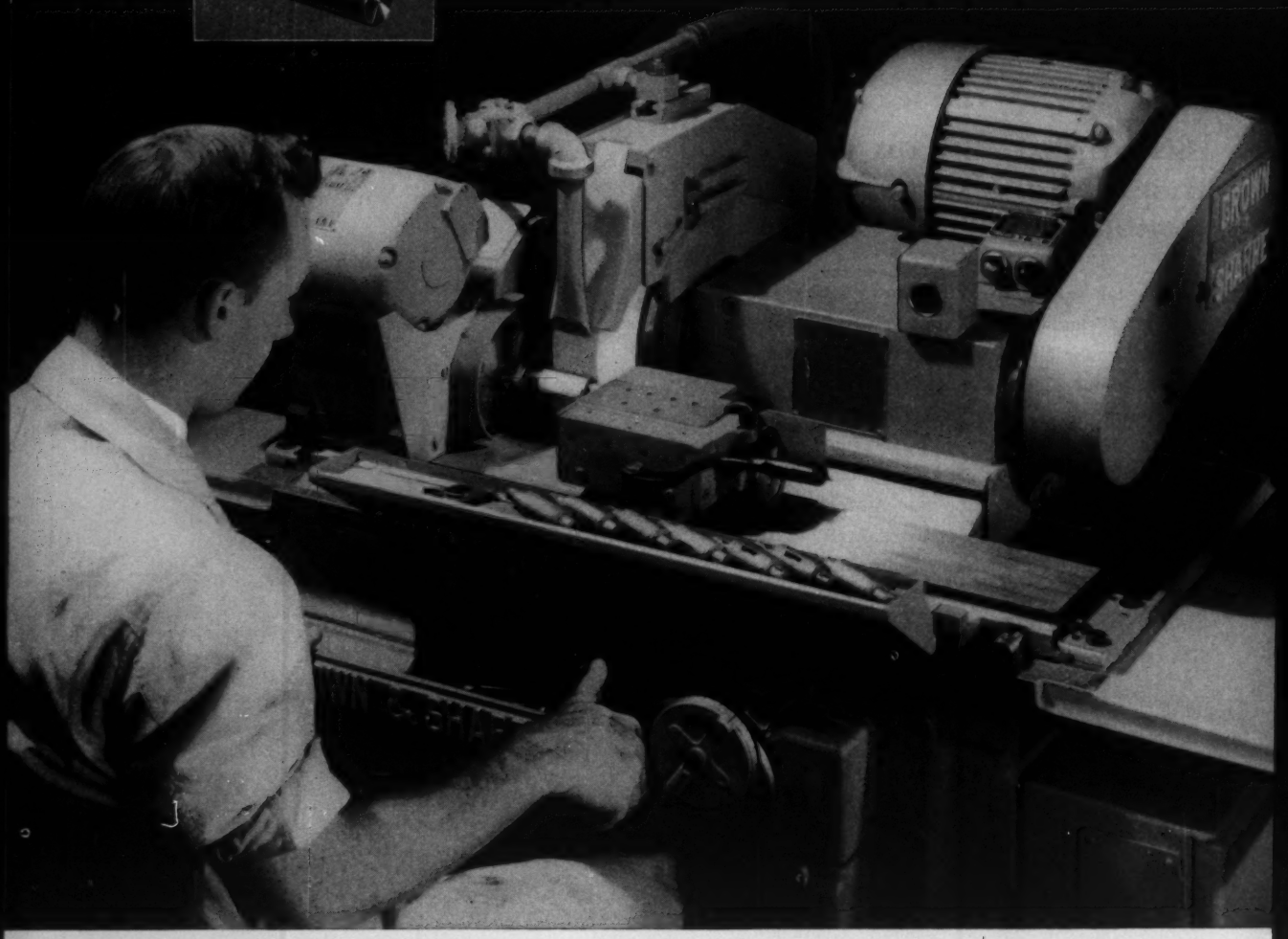
Send for your copy of the new Catalog No. 36P, which describes the complete line of B&S gear, vane and centrifugal pumps. Brown & Sharpe Mfg. Co., Providence 1, R. I.



Brown & Sharpe PRECISION CENTER

MMT-PE

TO HELP YOU GRIND MORE FOR LESS



New design No. 5 - the only plain grinder with a 5-year guarantee on a plain bearing spindle

The Brown & Sharpe No. 5 Plain Grinding Machine has remained first choice for production grinding of small parts for good reasons — its accurate repetitive sizing to split tenths, and its long record of cost-saving performance. Now, exclusive new advantages set today's top standards for operating efficiency and economy.

The interchangeable cartridge-type wheel spindle unit needs no adjustment, has self-contained lubrication — assures lasting accuracy in the low micro-inch range. The plain bearing unit is unconditionally *guaranteed for 5 years.* The spindle unit can also be furnished with super-precision, pre-loaded antifriction bearings.

Other design features available only in the new No. 5 include 1) super-smooth Oriflex drive in headstock; 2)"Permalign" footstock that permits fast, easy lever-operated work loading, and maintains accurate alignment; 3) flat swivel table top that is a horizontal working surface, hardened and ground for lasting accuracy.

Before you buy equipment for production grinding in the 1″ range, get complete information on all the profit-saving features of the new No. 5. You'll see why it offers you by far the best return on your machine investment. Write: Machine Tool Division, Brown & Sharpe Mfg. Co., Providence 1, R. I.

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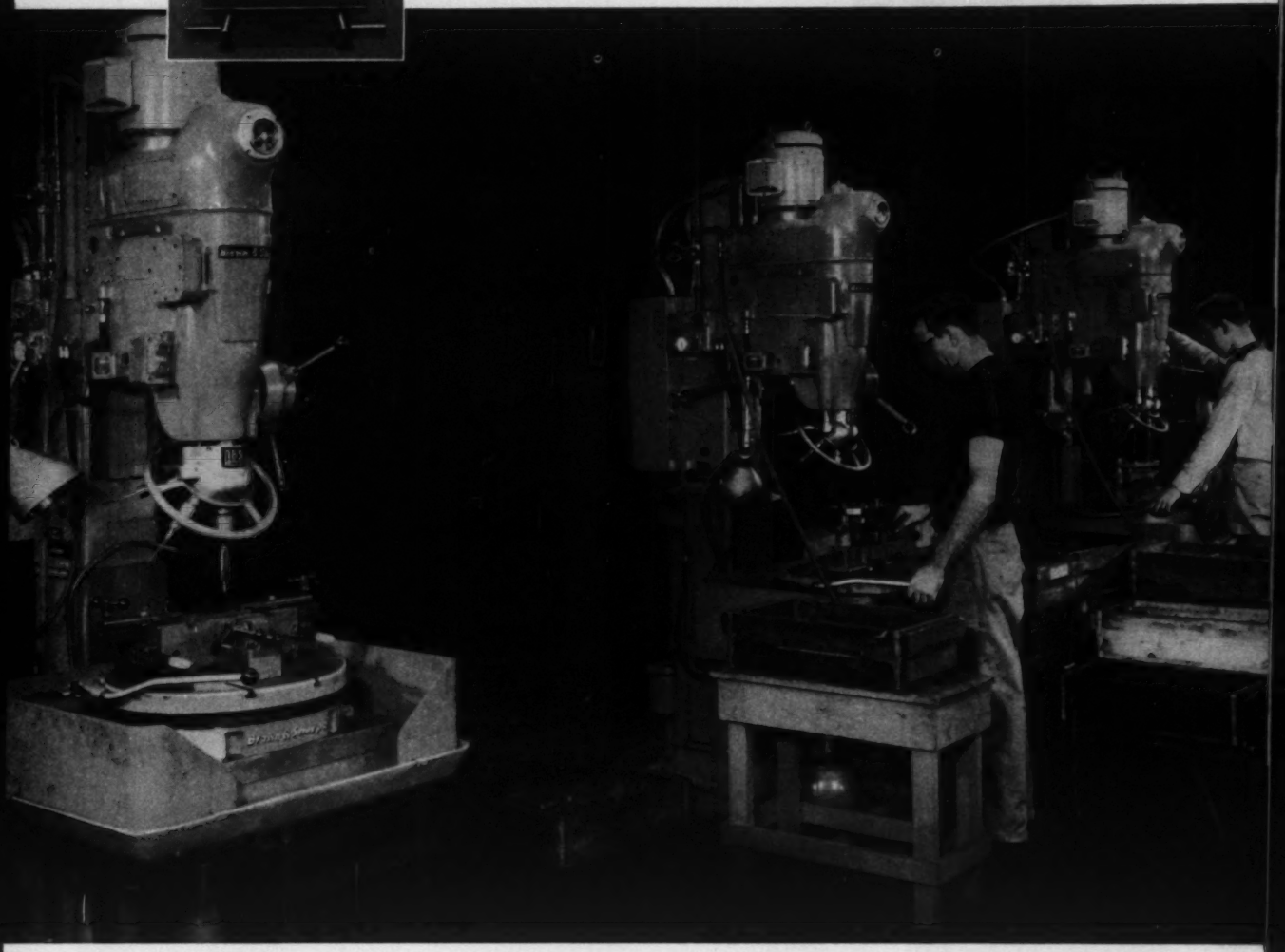
MMT-PE

TURRET DRILLING MACHINES...
TO HELP YOU DRILL MORE FOR LESS



American Hardware speeds production with Brown & Sharpe Turret Drilling Machines

At The American Hardware Corporation, three B&S Model A Turret Drilling Machines are used to machine 15 fitting points in mating parts. B&S Positioning Tables and simple holding fixtures maintain accurate relationship of machined surfaces.

With previous method, involving transfer of parts to several machines, dimensional relation of fitting points frequently varied. Parts had to be individually mated in assembly, often by hand filing and fitting.

Five hollow-milling and two face-milling operations are performed on the B&S Turret Drilling Machines, as well as drilling, tapping, and reaming. In all, 21 operations are performed on each complete part in 4 minutes total machining time.

Find out how you can save with Brown & Sharpe Turret Drilling Machines — in work transfer and set-up time, in jig costs, in tool wear and maintenance — in capital investment and floor space. Write: Turret Drilling Division, Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

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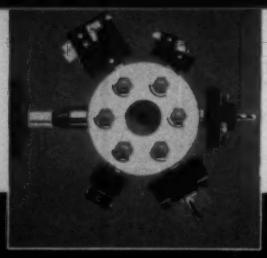
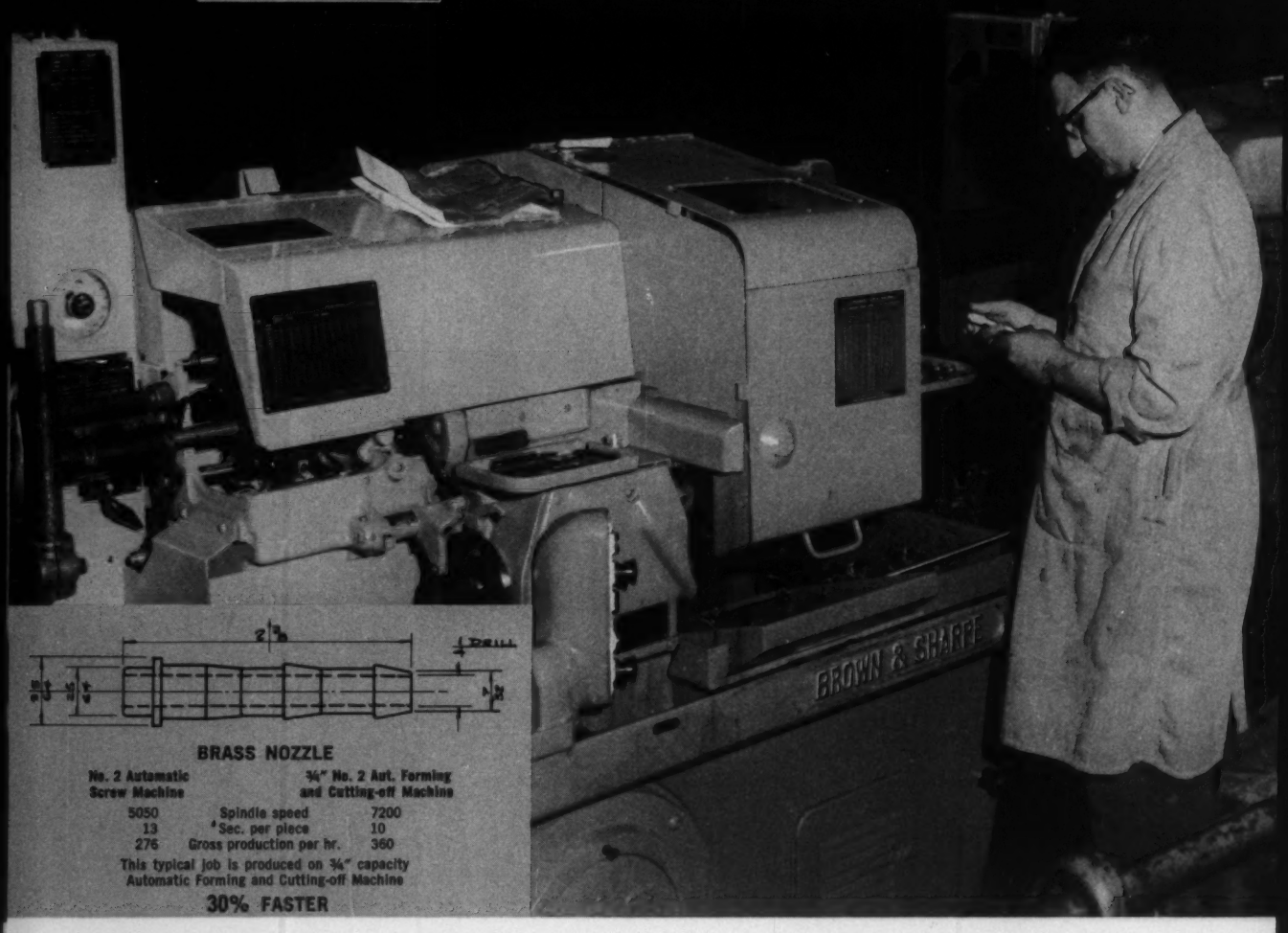
MMT-PE



TO HELP YOU REDUCE
SCREW MACHINE PRODUCTION COSTS



BRASS NOZZLE

No. 2 Automatic Screw Machine		¾" No. 2 Aut. Forming and Cutting-off Machine
5050	Spindle speed	7200
13	Sec. per piece	10
276	Gross production per hr.	360

This typical job is produced on ¾" capacity Automatic Forming and Cutting-off Machine

30% FASTER

Now - No. 2 Automatic size range and productivity - in a high speed forming and cutting-off machine

The new Brown & Sharpe No. 2 Automatic Forming and Cutting-off Machine, with six-hole turret and vertical slide, will perform practically all automatic screw machine operations except threading. For the big volume of bar work that does not require spindle reversal or stopping, it delivers all the record-setting efficiency and precision of the new-design B&S Automatics.

You get all the increased production potential of higher spindle speeds — up to 7200 R.P.M. for free-machining materials, with a full range down to 315 R.P.M. for tough alloys. You can take full advantage of carbide tooling and make multiple savings in production time. You get tolerances to 0.0005" on many jobs when forming or turning from the turret, with excellent surface quality. You get extra adaptability for combined operations, and for faster set-ups. Your equipment investment is substantially reduced, with a big plus in productivity.

The new No. 2 is available in 3 sizes — ¾" capacity with 18 speeds from 7200 to 450 R.P.M.; 1¼" capacity with 18 speeds from 5050 to 315 R.P.M.; 1½" capacity with 16 speeds from 3500 to 315 R.P.M. For complete details, write: Machine Tool Division, Brown & Sharpe Mfg. Co., Providence 1, R. I.

Brown & Sharpe PRECISION CENTER

Salt River Valley Water Users Association,
Phoenix, Arizona

Saves $699.00 per pump...

by using ground and polished

fatigue-proof STEEL BARS **e.t.d.**

made by elevated temperature drawing process

The men who operate the "Salt River" project have the job of supplying water to 240,000 acres of land in Arizona, where the Gila River joins the Salt River. The Association maintains some 250 deep well pumps to help supply the required water.

Richard Juetten, Supervisor of Salt River's Pump Division, reports that the use of La Salle FATIGUE-PROOF steel bars has permitted a saving of $699.00 per pump . . . a potential saving of $174,750 when applied to the 250 pumps now in operation.

Mr. Juetten's report follows:

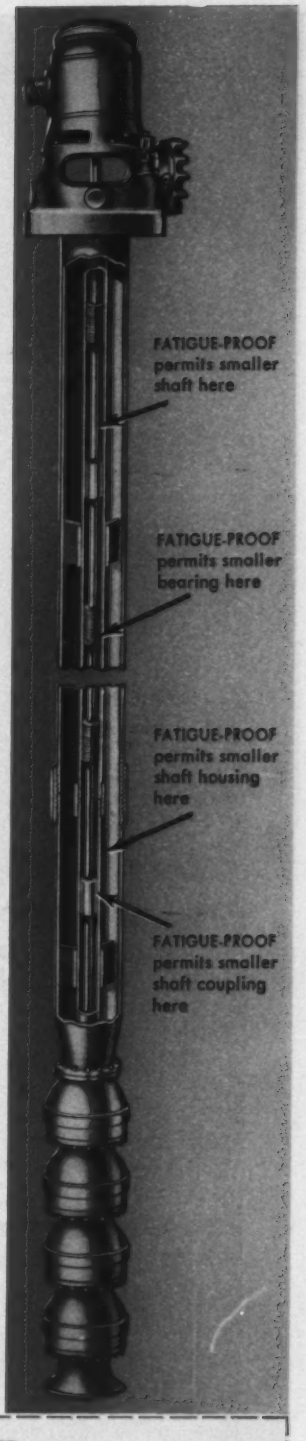
"I have figured our direct saving realized by using La Salle FATIGUE-PROOF steel bars in place of standard C-1045 steel shaft in our deep well turbine pumps.

"FATIGUE-PROOF enables us to use bars only $1\frac{11}{16}$" in diameter . . . instead of $2\frac{3}{16}$" diameter shafts which were necessary when we used C-1045 . . . and this despite higher horsepower, more weight, and additional pump bowl assemblies.

"Here are comparative costs per 10-foot section (of a 300-foot pump shaft):"

using C-1045		using FATIGUE-PROOF	
10' x 2-3/16" dia. shaft	$28.30	10' x 1-11/16" dia. FATIGUE-PROOF	$22.59
3½" shaft housing	26.30	3" shaft housing	19.80
2 bearings, 3½" x 2-3/16"	21.72	2 bearings, 3" x 1-11/16"	13.46
Shaft coupling	5.16	Shaft coupling	2.34
TOTAL cost	$81.48	TOTAL cost	$58.19
Cost per foot	$ 8.15	Cost per foot reduced to	$ 5.82

RESULT: A saving of $2.33 per foot . . . or $699.00 when applied to a 300-foot pump setting. And this doesn't take into consideration reduced power consumption.


FATIGUE-PROOF permits smaller shaft here
FATIGUE-PROOF permits smaller bearing here
FATIGUE-PROOF permits smaller shaft housing here
FATIGUE-PROOF permits smaller shaft coupling here

La Salle STEEL CO.

1414 150th Street
Hammond, Indiana

ASK FOR 24-PAGE BOOKLET—It tells the complete story of FATIGUE-PROOF®

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company_____

address_____

city and zone_____ state_____

Mail to La Salle Steel Company, 1414 150th Street, Hammond, Indiana

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

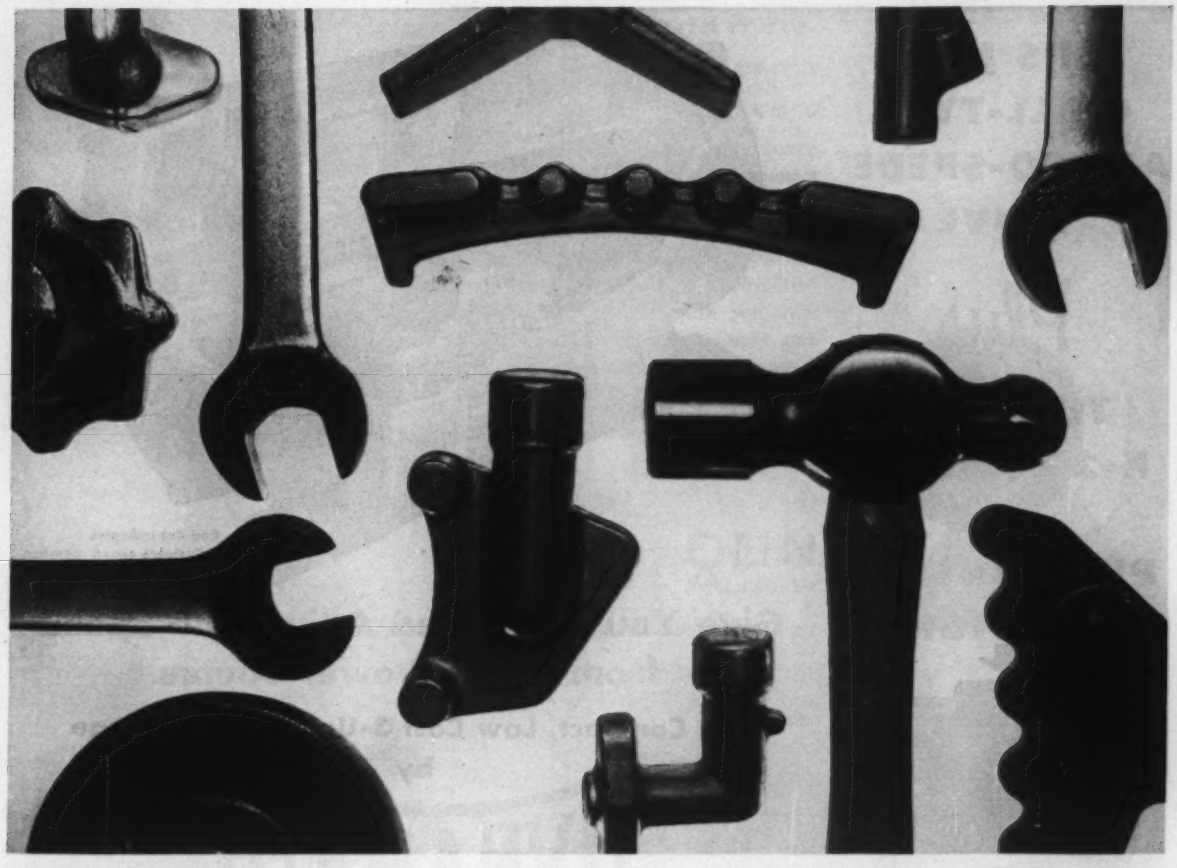
ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE



The Billings & Spencer Co. produces hundreds of quality forgings daily—from aircraft and missile parts to hand tools. Speedomax H temperature control helps hold rejects to a minimum.

Control of forge fires improves profitability...

... at The Billings and Spencer Co., Hartford, Conn., where Speedomax® H controllers are providing the right temperatures for a variety of forgings, ranging from mechanics' hand tools of carbon and low alloy steels, to aircraft and missile parts made of today's modern high temperature alloys. The combination of precise temperature control, good furnace design and good forge-shop practices has not only reduced rejects ... it has saved fuel and greatly improved furnace life. Rugged, compact and completely reliable, Speedomax H is providing similar benefits for numerous other heat treat operations ... is helping both to modernize production, and to produce a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office, or write 4957 Stenton Avenue, Philadelphia 44, Pennsylvania.

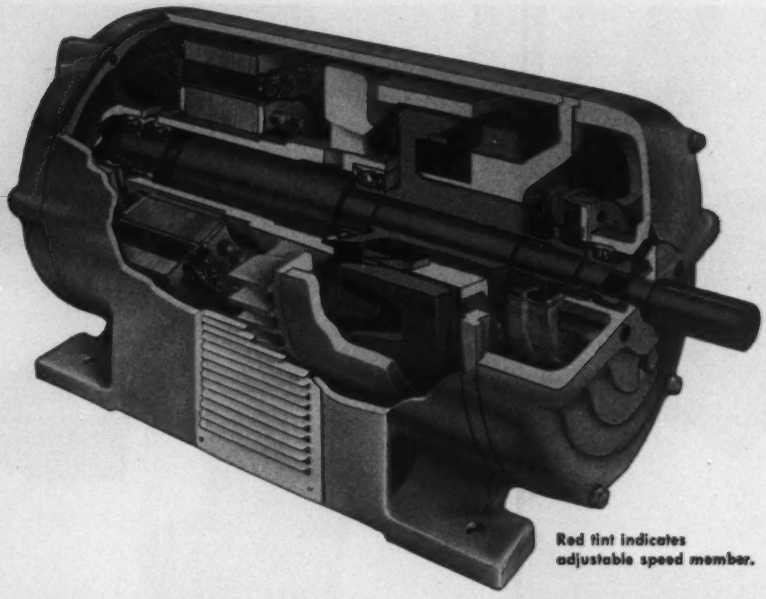
Unaffected by either high ambients or continuous vibration, Speedomax H provides dependable, uninterrupted regulation of forge temperatures.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

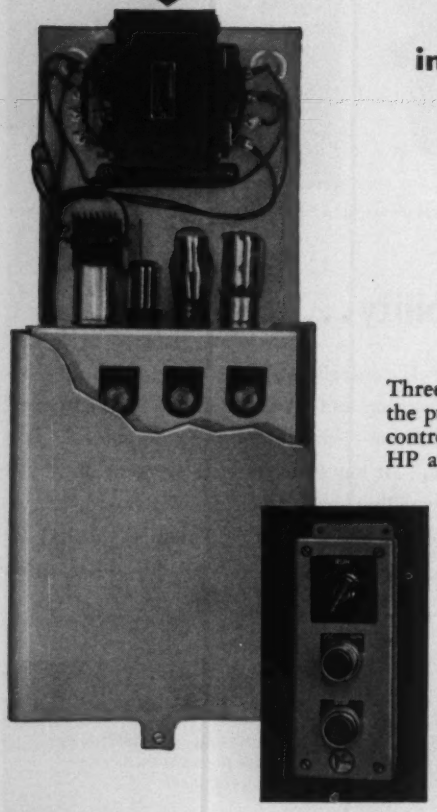
THIS NEW QUILL-TYPE AJUSTO-SPEDE® DRIVE

Plus

THIS NEW K-2 CONTROL and PUSH-BUTTON STATION



Red tint indicates adjustable speed member.



Give You Controlled Adjustable Speed from an AC Power Source

in a Compact, Low Cost 3-Unit Drive Package

by

DYNAMATIC®

PIONEER IN EDDY-CURRENT EQUIPMENT

Three compact components, the Ajusto-Spede Drive, the K-2 Control, and the push-button station make up this complete drive package which provides controlled adjustable speeds for any application from ½ HP through 7½ HP at 1800 RPM.

Remote wall mounting of the control panel conserves space on the driven machine; the push-button station places vital controls at the operator's finger tips.

Standard control features include on-off clutch control, infinite speed adjustment, constant speed regulation, and jogging. Any of a variety of special features may be easily and economically added to the standard control by the installation of a single resin-encapsulated circuit.

Send for complete information covering design and operation of the new models ACM-903 and 904 Ajusto-Spede Drives. Read how the new K-2 Control provides infinite speed adjustment, on-off clutch control, constant speed control, jogging, threading, cascading, and acceleration control.

Our New Bulletin K-2-159 is Now Available.

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DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

more and more, Olin Aluminum gleams on America's prestige cars

Grilles and trim that proclaim the elegance and enhance the sweeping lines of America's fine cars – these reflect Detroit's growing reliance on Olin Aluminum. High-precision extrusions... alloys and finishes of impeccable quality and uniformity... shipping schedules synchronized with assembly-line requirements – these are Olin Aluminum's contribution to 1960's prestige cars. Expect no less when you order from Olin Aluminum. Whether you make cars or casseroles, trailers or tumblers, boats or blinds – your orders get V.I.P. attention. Always.

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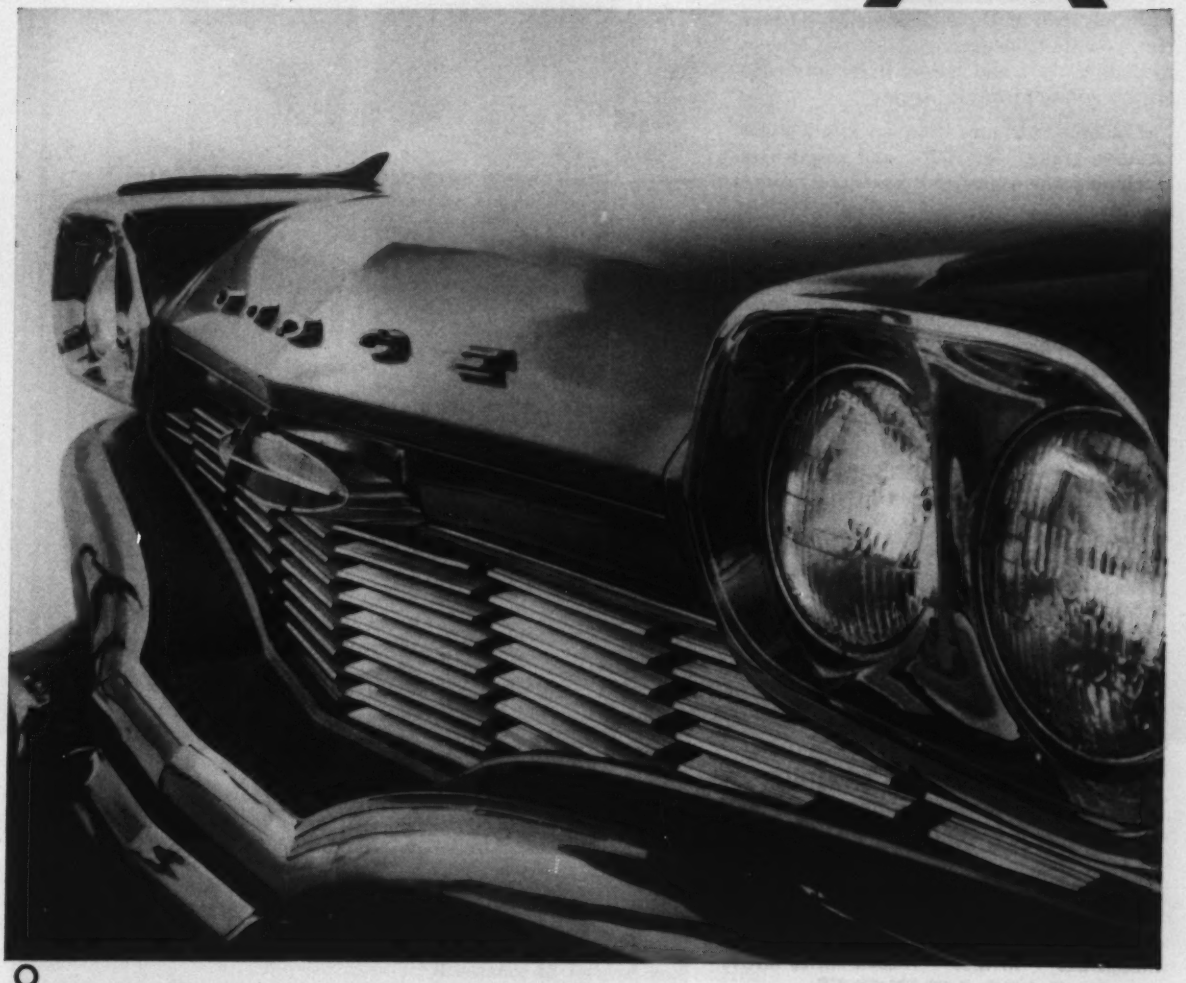
OLIN ALUMINUM

GRILLE FOR THE EXCITING NEW DODGE FABRICATED BY RYERSON-HAYNES, WORKING WITH OLIN ALUMINUM EXTRUSIONS.



OLIN MATHIESON · METALS DIVISION · 400 PARK AVENUE, NEW YORK 22, N. Y.

General Electric announces the new Adjust-O-Breaker toolholder!

Carboloy® toolholder with adjustable chipbreaker lets you adjust from any angle . . . offers any desired adjustment within its range* . . . features "floating" indexable chipbreaker with absolute repeatability.

MORE jobs with *LESS* tooling—that's what you get with this new Carboloy® Adjust-O-Breaker toolholder! No need to have a separate chipbreaker for every cutting job. No need to restrict yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder . . . and *adjust it for any chipbreaker setting within its range.**

Available right now from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker truly brings new meaning to disposable tooling.

So, to get cutting tool versatility that lets you handle *more* jobs with *less* tooling, check into the complete Carboloy line—Lift-O-Matic (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder. The complete line of Carboloy inserts, insert seats, convertible seats, and brazed tooling is the *broadest* in the industry . . . designed to meet *every* tooling need to give you BETTER PROFITS THROUGH BETTER TOOLING.

See your Authorized Carboloy Distributor now. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Blvd., Detroit 32, Michigan.*

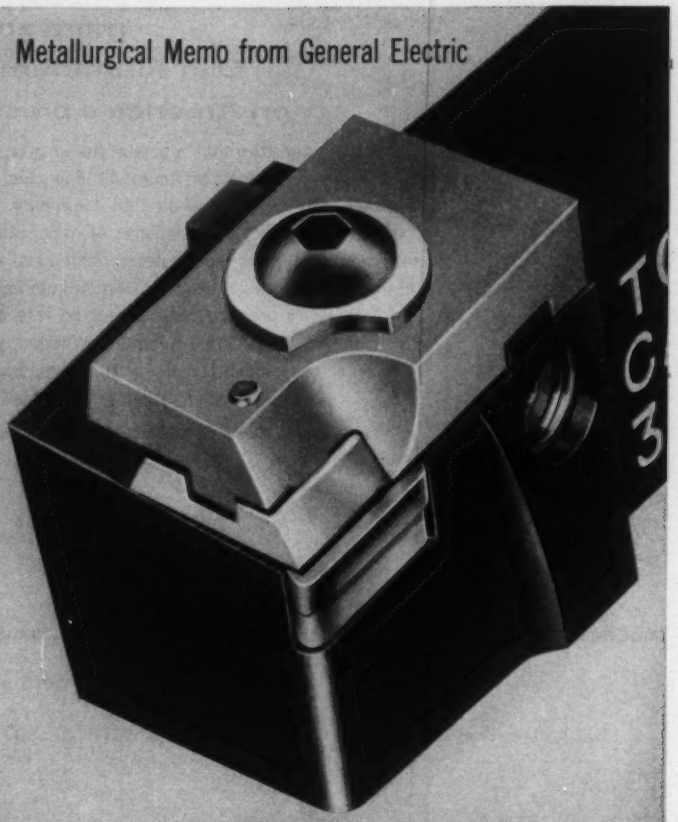
CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

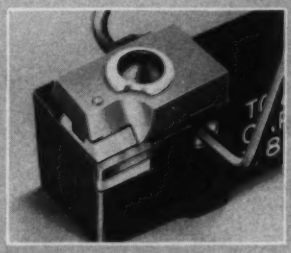
GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES
MAN-MADE DIAMONDS • MAGNETIC MATERIALS
THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

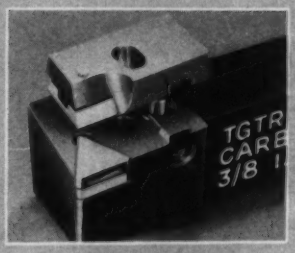
Metallurgical Memo from General Electric



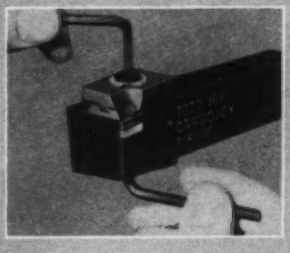
*Sizes 16V and 85V: adjustable range 1/16" to 7/32"
Size 20V: adjustable range 1/16" to 1 1/32"



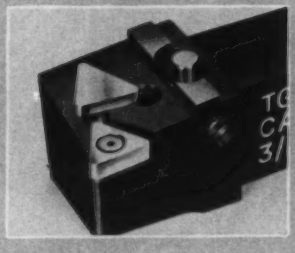
1. Chipbreaker setting adjusts to any width within range.* Set screw with two open ends provides access from either side. No springs to adjust.



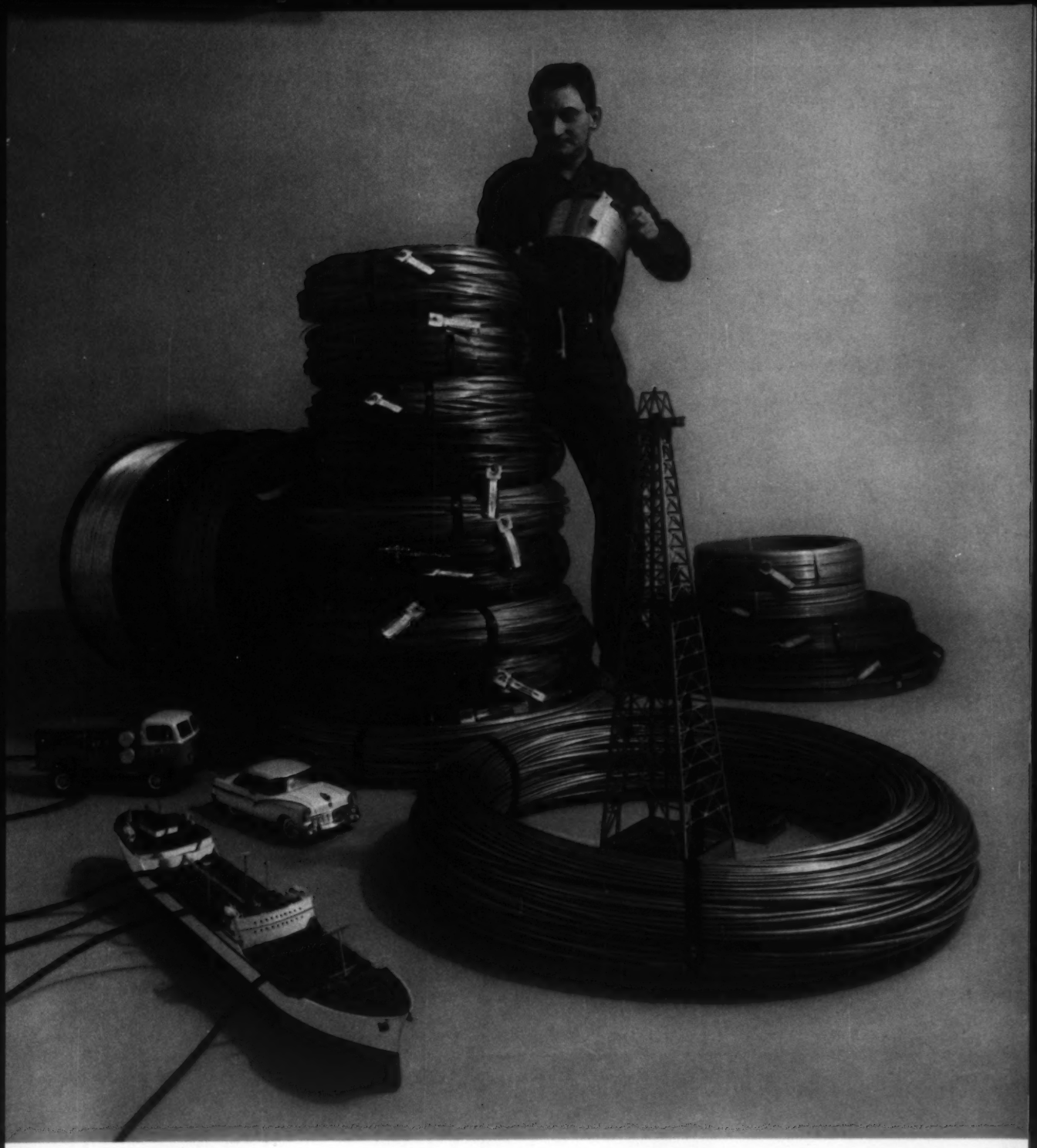
2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp screw is accessible from top or bottom; allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seat are used with toolholder. Insert seats are indexable and self-aligning.



Strong Restraining Influences... Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

Roebling... Your Product is better for it

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The Colorado Fuel and Iron Corporation

Flash butt-welded ring from extruded material slashes away 64 lbs. of stainless 310

Only 1/3 as much material was required when a special extruded section was substituted for bulky bar stock in this flash butt-welded ring. By leaving 2/3 of the material at the mill, instead of hogging it out, Amweld saved its customer $76.83 per ring—plus hours of expensive machining. (Savings compared to the forgings originally used are even greater.)

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

Three Ways Steel Settlement Can Help You in Bargaining

While the steel labor agreement is clearly a union victory, it has three implications you may be able to use to advantage in your labor negotiations: 1. The first direct wage increase won't come until Dec. 1—23 months after the last wage hike. 2. The settlement introduces a device for controlling cost of living escalation and insurance. 3. The pact probably rules out any general price increase until after Dec. 1. But it still makes the 1960 bargaining weather inclement (Page 51).

Strike's Impact Reflected in Consumer Attitudes

Uneasiness and caution spread among consumers as a result of the steel strike, the University of Michigan found in a survey of consumer attitudes in November which was released last week. The strike's impact was not limited to persons directly affected but was reflected in the buying attitudes of most of the people surveyed. Other findings of the survey: Tight money is reducing the number of people planning to buy homes . . . More people are concerned about rising prices, which may impede purchases of consumer durable goods . . . Long range expectations are still highly optimistic . . . Many of the people planning to buy new cars say they'll choose compact jobs . . . Opinion in favor of installment buying is still spreading.

Tight Money Won't Halt Inventory Building

Money will stay tight through the first half, but it won't cause any serious problems in financing inventories, declares Edwin B. Moran, executive vice president, National Association of Credit Management. He expects some easing of credit by summer, with a leveling off in interest rates in the second half. Purchasing agents queried by STEEL report improved liquidity due to higher profits and lack of inventory building during the steel and copper strikes. Only a handful expect to enter the money market to rebuild stocks this year (Page 54).

Exports to Rise in '60, Says Commerce

The outlook is "highly promising" that U. S. nonmilitary exports this year will gain a wider margin over imports than in 1959, says the Department of Commerce. But Commerce warns that U. S. exporters face a buyers' market abroad and that foreign sales will require "more vigorous efforts in sales

promotion." The department adds that "some further increase in U. S. purchases from abroad is likely this year." U. S. exports exceeded imports by only about $1 billion last year (vs. $3.5 billion in '58). Commerce Secretary Frederick Mueller says our exports could rise 10 to 15 per cent this year "if we work at it." As an aid, the department plans a hard sell approach to its trade fair program.

Why Industry Hires a Bargaining Pro

Professional labor negotiators like Ray Vacha (picture) are turning up at more and more bargaining tables—especially when the company involved is medium in size. (Giant corporations have their own professionals; small firms usually don't need them.) Reasons for more pros in bargaining: 1. Labor contracts are getting more complex. 2. Bargaining is getting tougher. 3. The pro knows the details of changing labor laws and area settlement patterns. 4. He can lend an air of objectivity to gain a fair settlement (Page 62).

More Metalworkers Put Radiation to Work

Expect the industrial use of radiation (with x-ray or radioisotopes) to expand sharply this year. Almost 1000 firms already are licensed by the Atomic Energy Commission to use isotopes, reports John A. Reynolds, technical director, Picker X-Ray Corp., White Plains, N. Y. He contends that "uses are limited only by ingenuity and imagination." In one year, 588 industrial firms saved $39,113,416 through an investment of $3,740,816 in radioisotopes, says the National Industrial Conference Board (Page 53).

How to Sell Your 'Hidden Extras'

"A customer complaint should be treated as a golden opportunity. If he does you the favor of complaining, try to prove that he is right, not wrong." So says Cary Wilson, vice president, Modine Mfg. Co., Racine, Wis. He typifies a new emphasis in metalworking: Market the "hidden extras" in your product—the service, delivery, special features, design improvements, customer engineering, reliability—that give you a competitive edge. For how it can pay off, see Page 56.

Machine Tool Shipments to Rise, Says Commerce

Expect 1960 shipments of cutting type machine tools to total more than $580 million and shipments of forming types to total more than $180 million,

predicts the Department of Commerce. It says present order backlogs average more than five months. A relatively high percentage of the machines in U. S. plants over ten years old must be regarded as obsolete in the light of advanced technology, greater unit productivity, and tolerance capability incorporated in new machine tools, asserts the department. It says European machine tool builders are continuing to establish distribution outlets in this country, where they sell at prices 25 to 40 per cent below the U. S. builders' level.

Solved: Mach 3 Manufacturing Problems

Production men at North American Aviation Inc. had a host of metalworking problems to solve before they could start building the first of our B-70 bombers. Among the challenges: Handle a steel skin only 0.006 in. thick (like foil) through machining, forming, welding, brazing, heat treating, and other steps. To find how they solved that and other tough metalworking problems, see Page 86.

Financial Men Are Tougher to Hire

Nationwide demand for financial executives jumped 63 per cent in the last quarter of 1959 (vs. the like '58 period), finds the latest survey by Heidrick & Struggles, Chicago executive recruiting firm. "Most firms are seeking men qualified to handle controller's functions, including the building of strong cost programs, tax and budget planning, and financing," reports John Struggles, partner. While still high, total executive demand dropped slightly in the last quarter from 1959's third quarter level—largely due to a 44 per cent decline in demand for defense engineers. Demand for personnel executives and general engineers was sharper. Other trends spotted: 1. Older executives—even those in their late fifties—are becoming more acceptable. 2. It's getting tougher to hire fully qualified executives. 3. Salary levels are maintaining a steady upswing.

New Missile Announced: Skybolt Air to Ground

Despite the transfer of funds from aircraft to missiles, the Air Force counts on bombers to defend the country through the middle '60s. Last week, it announced an R&D program for a solid fueled, bomber fired, bird with a range of 1000 miles.

U. S. Boosts Missile Program

The National Security Council has decided to build another seven squadrons of ICBMs. It is reliably reported that 40 Atlas missiles and 30 Titan missiles will be added by 1962-63. Already planned are 20 squadrons (nine Atlas, 11 Titan) to be operational in the 1960-62 period. And the fiscal

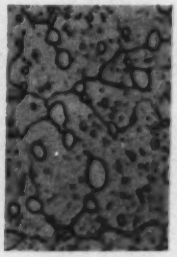
1961 budget, announced today (Jan. 18), will contain funding for the construction of three Polaris missile firing, atomic submarines. Each sub carries 16 Polaris missiles. Funds for the projects are believed to come from cutbacks in the Navy's surface shipbuilding program and the B-70 program.

Missile-Space Investigation Begins

Secretary of State Christian Herter leads a long list of witnesses scheduled to appear Jan. 20 before Rep. Overton Brooks's (D., La.) Science & Astronautics Committee. Missile industry executives will appear to defend industry's role in the space lag. Critical item on the agenda: Why is Atlas production running at one-third to one-half capacity when the National Aeronautics & Space Administration can't get enough Atlas boosters to conduct scheduled space probes? Representative Brooks will push to boost NASA's fiscal '61 budget to over $1 billion (vs. $800 million now planned). Sen. Lyndon Johnson's (D., Tex.) preparedness subcommittee opens similar investigations later this month.

New Wear Resistant Steel Is Easy to Heat Treat

A new alloy offers better wear resistance at room temperatures than high carbon, high chrome steels. Produced by Carpenter Steel Co., it has good dimensional stability and is fairly easy to handle in heat treating (Page 100). It has angular carbides from tungsten (left photomicrograph) rather than the rounded chromium carbides.



Straws in the Wind

Displeased with the steel settlement, a Chicago area steel company executive asked for a refund of his contribution to the Nixon dinner ($100 a plate) in Chicago on Jan. 27 (He got it.) . . . Financial experts expect another hike in the Federal Reserve Board's discount rate soon . . . The Italian government removed restrictions on about 200 products imported from the U. S., including tractors, pumps, transmission shafts, varnishes, many rubber products. Further liberalization is under consideration . . . The Santa Fe Railway plans a $100 million capital expenditure program for this year . . . The special import tax imposed by the Philippines has been cut from 15.3 per cent to 10.2 per cent . . . American Motors Corp. is negotiating to assemble Ramblers in Australia . . . Look for more "double bottoms" (two-trailer trucks) to appear on turnpikes as traffic managers clamor for lower costs . . . Minneapolis-Moline Co.'s new Materials Handling Div. is off to a flying start with a $3.25 million Navy order for tractors and fork trucks . . . Prof. Kenneth J. Arrow of Stanford University suggests stimulating private spending for basic research through the creation of industrywide institutes . . . Florida's share of atomic energy sales will hit $1.2 billion this decade, believes Gov. LeRoy Collins.

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Fish lure, made of Nickel Brass.

tting disc (Chrome Steel) and waste basket.

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Hair brush, made of Red Goldbond Steel.

Torpedo Level. The metal is Nickel Zinc.

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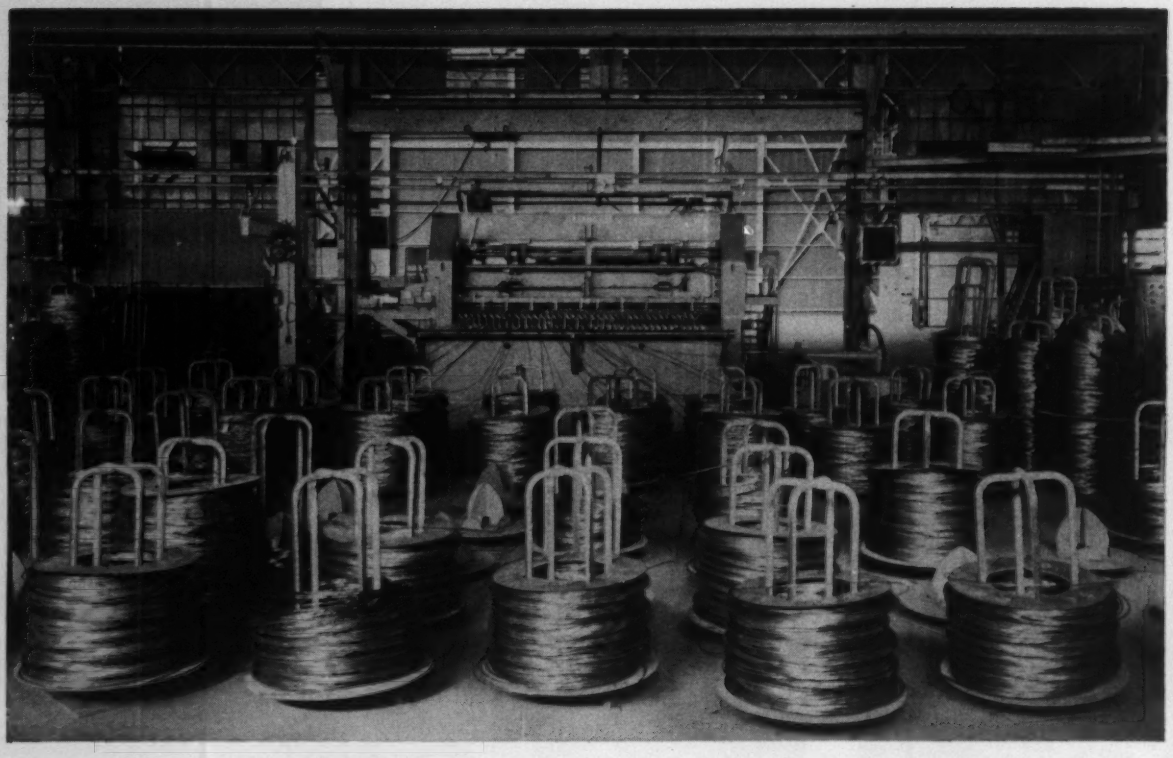
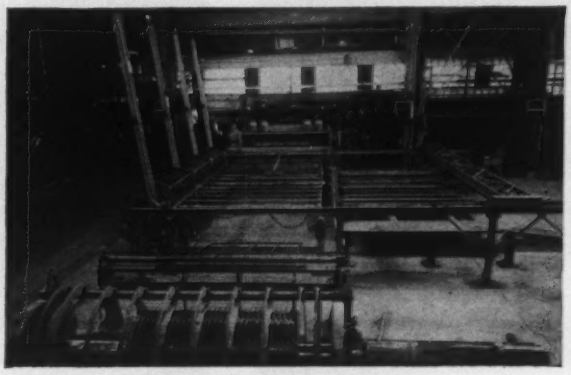


Let DSC LPR COILS help cut your brite wire fabricating costs as they have done for our Portsmouth Division on Welded Wire Fabric



Look closely at the entry side of this giant Welded Wire Fabric machine. This one produces mesh in widths up to 13′, used for reinforcing concrete in road, pipe and other construction. Fed by as many as 80 - 3,000 pound Brite Wire LPR's running simultaneously off as many reels, it produces rolls from 300′ to 500′ long, weighing up to about 6,000 pounds. The flat mats or sheets run up to 30′ long.

In the photograph at the right, you see the delivery side of the welder, shear in the background, coiler in front and, in between, the fully automatic "flipper" and piler . . . the only one of its kind, we are told.

Our original purpose in developing continuous-length, long-production-run LPR's was to improve the efficiency of our own mesh operations. Compared with regular mill coils weighing about 300 pounds which we used previously, our 3,000 pound LPR's reduced downtime frequency by 90% and attendant coil-change and other costs proportionately.

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CUSTOMER "REP" OFFICES IN PRINCIPAL CITIES

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How Much Inflation?

The steel wage settlement has inspired many predictions of a new inflationary wave that would shrink the dollar to the size of a 25 cent piece.

We don't think such utterances make sense, nor are they good for the economy.

Let's check the facts:

The 1956 steel contract cost 83 cents an hour in terms of higher employment costs.

It included: Base wage increases of 21.5 cents an hour; increased premiums for second and third shifts, holidays, and Sundays; a seventh paid holiday; Supplemental Unemployment Benefits; increased pensions and insurance; and an open end cost-of-living provision costing 17 cents.

However, most of the increased costs were in effect by July 1, 1958. The last penny of the 17 cent cost-of-living adjustment was added Jan. 1, 1959.

Despite those added costs, the industry had high earnings in first half of 1959 because of peak operations.

Under the new contract, the companies will pay the full cost of insurance, improve pension and sickness benefits, and increase SUB allocations from 3 cents to 5 cents an hour.

On Dec. 1, 1960, base wage rates for Classifications 1 and 2 go from $1.96 to $2.03 and on Oct. 1, 1961, to $2.10. Increments between the 31 job classifications go from 6.7 to 6.9 cents Dec. 1 and to 7 cents next year.

To those rates, of course, must be added the 17 cent adjustment accumulated under the 1956 contract. The new contract limits cost-of-living adjustments to 6 cents, and if insurance costs rise, they may be deducted.

Depending on the company, the 1960 wage package totals 39 to 41 cents, less than half the 1956 figure.

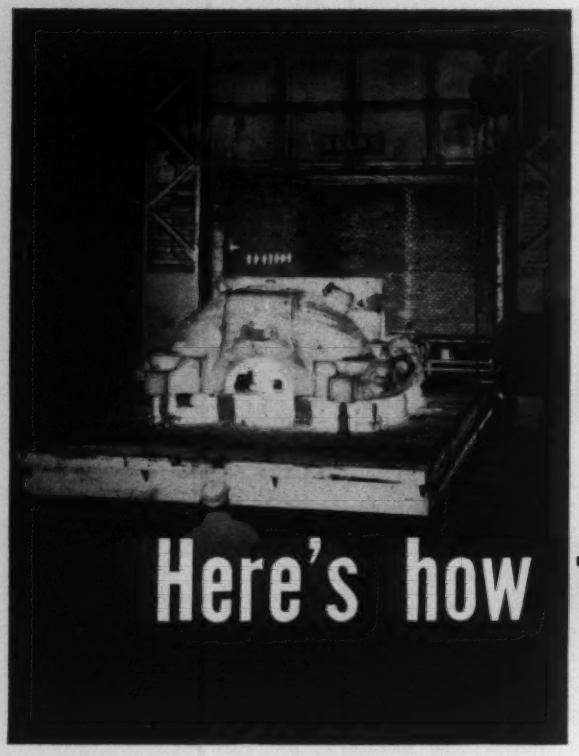
As verification, Chairman Roger Blough of U. S. Steel says employment costs will rise 3.5 to 3.75 per cent in the next three years, including cost of living, vs. an 8 per cent average over the last 20 years.

Chances are steel prices will go up, but here are more reasons why the industry will go slow in making adjustments: 1. Government anti-inflation pressure. 2. Tight money. 3. A renewed drive to improve production efficiency. 4. Foreign competition. 5. More union co-operation on work rules at local levels.

Of course, the settlement is inflationary—but not as much as many people think. It should not be the signal for unreasonable wage and price increases in other industries!

Irwin H. Such

EDITOR-IN-CHIEF



CASTINGS of high alloy steel are hardened and toughened in Selas Gradiation-fired car-bottom furnace. Picture shows 35-ton turbine shell casting after heating to 1925°F and held at temperature for 10 hr. Turn of valve converts furnace to lower temperature unit for reheat following air-cooling. Time cycle required for this operation reduced 20% through Gradiation fast heat-up and control.

Here's how the Steel Industry

Throughout the steel industry—in mills and metal-working plants—Selas Gradiation® heat processing is successfully used in many operations. The versatility and adaptability of the Gradiation principle are demonstrated by the diversity of applications shown in the installation photographs on these pages.

Gradiation is a concept and technique of heat processing which coordinates fast, controlled heating with the nature of the workpiece . . . considering its composition, size, shape, heat transfer characteristics and physical properties . . . to develop desired product quality, in minimum time, with maximum efficiency, and with the use of automatic and compact equipment.

Designed and custom-built to meet your specific heat processing needs . . . for hot working . . . galvanizing . . . tinning . . . heat treating heavy sections and special shapes . . . Gradiation equipment contributes production economy, high production rates, ease of handling.

At your convenience . . . without cost or obligation to you . . . a Selas field engineer would welcome the opportunity to survey your needs. For this personal service—or for a copy of our new Bulletin "Selas Gradiation Heating in the Steel Mill"—write to Mr. R. E. Buckholdt, Mgr. Furnace Division, Selas Corporation of America, 21 Dreshertown Road, Dresher, Pa.

Gradiation and Duradiant are registered trade names of Selas Corporation of America

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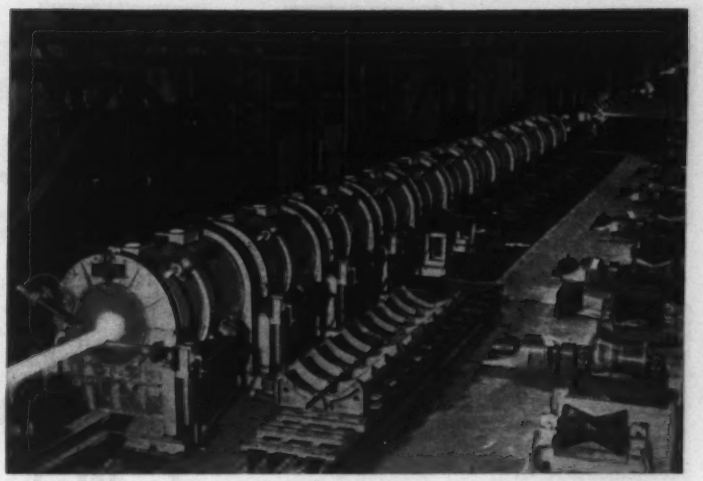
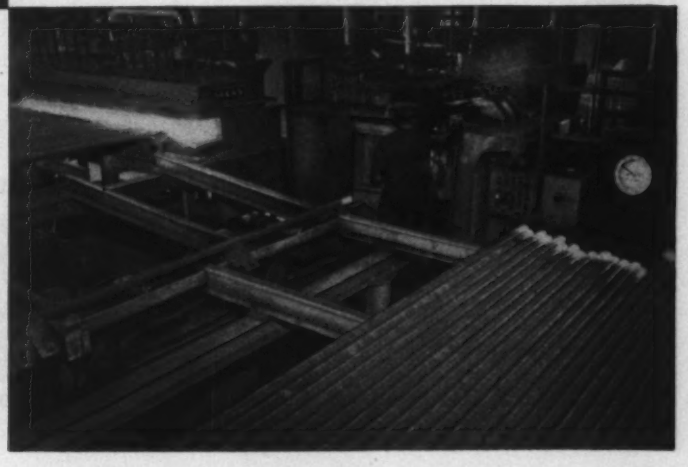


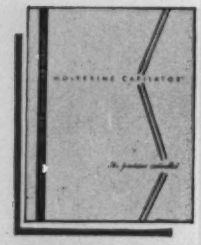
TUBING . . . is normalized and, if required, stretch-reduced in this Selas barrel-furnace line. After forming and welding, the tubing is conveyed through a 48-barrel normalizing line with exit temperature approximately 1650°F. Stretch-mill product proceeds through additional 12 Gradiation furnaces which heat tubing to 1800°-1850°F. Entire process is automated.

uses SELAS Heat Processing

STRIP is continuously bright-annealed in this single-pass, direct-fired furnace. Designed for fast, uniform heating, Gradiation strip lines are compact, easy to install, simple to operate, economical to maintain. This concept of strip heating is also used for annealing of stainless steel, tin reflow, galvanizing-annealing, blueing, preheat for galvanizing and annealing.

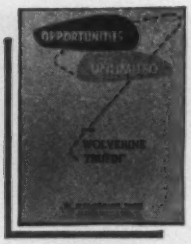


TUBE-ENDS are heated for upsetting (for subsequent threading) in this slot-type Selas furnace. As each tube-end is fast heated to 2300°F, the tubing automatically moves down handling table to upsetting machine. Direct-fired Duradiant® gas burners are patterned to assure temperature uniformity within limited area of each tube-end.



1. Wolverine Capilator Catalog

2. Wolverine Aluminum Catalog



3. Opportunities Unlimited

4. Wolverine Trufin Catalog

5. Copper Refrigeration Tube Book

6. Measure of Tubemanship

When it comes to tube... come to Wolverine

From Wolverine Tube, manufacturers can obtain a great variety of tubular products. These range from such products as tiny, plug-drawn Wolverine Capilator® used for restriction purposes, to commercial copper tube up to 6 inch O.D. and aluminum tube to 3 inch O.D.

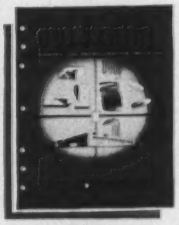
Illustrated on this page—and reading like tubing's "best seller" list—is the latest Wolverine Tube literature dealing with all the company's products and specialized services. Look these catalogs over. A request, on your letterhead, will bring you the catalog . . . or catalogs . . . of your choice without delay or obligation. Just write Dept. S—TODAY!

10. Water Heater Catalog

7. Design & Cost Comparison

11. Commercial Tubing Book

8. Process Flowsheets



12. Wolverine Serves The Refrigeration Industry

9. Statement of Scope

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CALUMET DIVISION
URANIUM DIVISION
GOODMAN LUMBER DIVISION
WOLVERINE TUBE DIVISION

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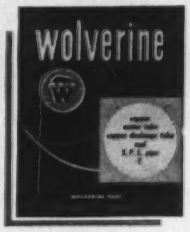
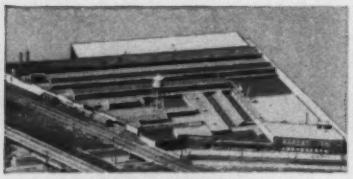
SALES OFFICES IN PRINCIPAL CITIES.



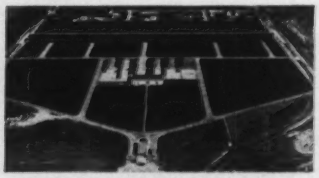
13. Copper Water Tube Catalog

14. Wolverine Corrosion Chart

PLANTS LOCATED:



DETROIT, MICHIGAN



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TO THE STANDARDS
OF AMERICAN INDUSTRY

After the Steel Settlement:

Metalworking Looks for Salvage

CHECK at least three salvage values in the steel settlement that could benefit you.

• 1. The pattern making contract provides for no direct wage increase until Dec. 1, 1960.

Steel's last direct wage hike that came about as a result of the 1956 pact occurred on Jan. 1, 1959—a 1 cent boost under the cost-of-living provision. So 23 months will elapse between direct wage increases in steel.

Other metalworking companies which must negotiate contracts in 1960 can score by pointing that out to their unions. About half of all major collective bargaining agreements expire in 1960, says the Bureau of Labor Statistics. More than 120 contracts covering 5000 or more employees run out in the coming year, and another 60 permit reopening on wages. The largest number of expirations will come in the second quarter. Major parleys will come in coal, mining, railroads, aircraft, communications, and shipbuilding. In addition, thousands of contracts, mostly small, have already expired but were allowed to continue, pending the steel outcome.

• 2. The settlement introduces a device for controlling imponderable costs of escalation and insurance in the contract.

U. S. Steel Corp. is the pilot company whose insurance costs will control escalation. The contract provides: When the corporation's added insurance expenses exceed 7.04 cents, the excess will be offset by reducing or eliminating the possible cost-of-living gains. A good bet is that U. S. Steel's added charges will exceed 7.04 cents.

Labor observers advise the adaptation of such a safeguard to control costs in your contract, particularly if it's a long term pact.

• 3. The steel agreement probably rules out any general price increase until next Dec. 1 when the first pay gain goes into effect.

While some selective increases are possible before December, your steel costs should be fairly stable for nearly a year. If spot adjustments do come, a likely route is via extras.

Steel company costs go up immediately by 10.6 cents an hour (for some, it may be more) as a result of increases in insurance and pension charges that became effective Jan. 1. That means direct employment costs climb now by about $1.65 per ton of steel produced. The profitable high volume expected for most of the year should enable much of the industry to hold off for a while on the general increase. But next December's upward movement in expenses will be too much for the companies to stand without more income to offset them.

• Despite the silver linings in the steel settlement, it still will make the 1960 bargaining weather cloudy. The greatest danger is that metalworking will give up on work rules.

"Don't lose heart," urges Owen Fairweather, an attorney and negotiator with the Chicago firm of Seyfarth, Shaw, Fairweather & Geraldson. He points out that even

39-41 Cents

How Steel Settlement Costs Break Down

Only cents-per-hour averages are covered. Every company's experience varies.

8.4 cents—Dec. 1, 1960, wage increase, including increments between job classes.

7.7 cents—Oct. 1, 1961, wage increase, including increments between job classes.

5.3 cents—Passalong costs for such things as incentives, vacations, holidays, overtime, and social security caused by higher wages.

7.2 cents—Cost-of-living gains, including the two, 3 cent possibilities and passalong costs they cause.

3.6 cents—For pensions.

7.0 cents—For insurance. If costs exceed this for the pilot company, U. S. Steel Corp., that excess offsets cost-of-living boosts.

2.0 cents—As a contingent liability for Supplemental Unemployment Benefits. This won't apply as an increased cost for many firms, hence the 39 to 41 cent spread.

How the Settlement Will Boost Equipment Buying . . .

A STEEL survey of 26 companies representing 46 per cent of the nation's steelmaking capacity finds that:

1. The steel industry will place orders for 31 per cent more capital equipment during the first half of 1960 than it did during the last half of 1959. (The firms surveyed will spend $401.5 million this half vs. $307.4 million last half.)

2. During the full year, the same companies say they will place orders for $704 million worth of new equipment (vs. $584 million in 1959). That's a gain of 21 per cent. The prediction may be conservative since many firms indicate they haven't completed their budgeting.

Here's how ordering plans will change for 12 types of equipment, in 1960's first half vs. 1959's last half. . .

Blast furnaces & related equipment	**Up 100%+**
Open hearths & related equipment	**Up 100%+**
Flat rolled product facilities	**Up 38%**
Structural product facilities	**Up 39%**
Bar mill facilities	**Up 34%**
Tubular product facilities	**Up 22%**
Rod & wire mill facilities	**Down**
Heat treating equipment	**Up 29%**
Surface cleaning & refinishing equipment	**Up 100%+**
Material handling equipment	**Up 28%**
Machine tools	**Up 25%**
Testing & inspection equipment	**Up 32%**

in this area the steel industry salvaged a little. It got the union to agree that the settlement of a work rule grievance prior to arbitration shall not constitute a precedent in the settlement of grievances in other work rule situations. The question of precedence was one of the problems under the 1956 pact.

• Another danger is that the steel contract will be slavishly followed.

Situations vary from company to company and a provision relatively cheap for steel may be ruinous for you, point out industrial relations experts. An example is insurance. Costs vary by as much as 3 to 5 cents an hour even within the steel industry. That's because the age dispositions vary and because administrative costs in insurance depend on the volume of the premiums. A company with group life for 10,000 will enjoy substantially lower administrative expenses than one with only 1000.

• A third danger in 1960 will be that we tend to overlook the multiplying and compounding effects of present day settlements.

The direct wage increases provided for in steel amount to 16.1 cents an hour, but you have to add 5.3 cents to that in passalong costs resulting from higher incentives, more expensive vacations, holidays, overtime, and social security.

And charges in long term contracts can be astronomical. Take steel again. The new contract's employment cost increases, when projected over three years, look like this:

$175 million in the first year.
$356 million in the second year.
$543 million in the third year.

$1.074 billion total.

The implications of the steel pact may not be good, but they're not as bad as a carpet manufacturer saw them when he announced a price hike earlier this month "because of the steel settlement."

Foundries Ready Plans For Equipment Buying

The foundry industry plans major expenditures in 1960 in anticipation of 20 to 25 per cent increase in shipments. Seventy-eight per cent of 2800 foundries report they will make capital improvements.

While some capital expenditures will be made to increase capacity, improved operating efficiency is the aim in most cases.

This list shows the degree of participation and the type of equipment involved:

Buying Plans for 1960

Category	Percentage of Industry
Molding machines	19%
Core blowers	15%
Sand preparation equip.	22%
Core & mold ovens	5%
Conveyors	18%
Cranes	5%
Hoists	7%
Trucks & front-end loaders	13%
Melting furnaces	25%
Heat treating & annealing equip.	8%
Shakeout equip.	9%
Blast cleaning equip.	11%
Dust arrestors	6%
Air compressors	8%

Don't Miss STEEL's Analysis

Of the impact of the steel settlement on the metalworking industry and the economy . . .

Watch for It in This Spot Next Week

Manmade Atoms Cut Industry Costs

A RETURN of $10 for every $1 invested—that's the over-all experience of companies that have put radioisotopes to work for them.

In 1957-58, during a 12 month period, 588 firms invested $3,740,816 in radioisotope equipment and facilities and realized net savings of $39,113,416. That is one of the important facts disclosed by a National Industrial Conference Board census conducted under a contract from the Office of Isotope Development of the Atomic Energy Commission.

The census, first of its kind, covers all known users, uses, costs, and savings. It shows that on Mar. 1, 1958, 945 industrial companies held 1500 licenses from the AEC to use the manmade atoms. Of those, 588 submitted usable data. Eighty-three are among the nation's 100 largest companies and about half are among the 500 largest.

• **What They've Done**—NICB reports: "Radioisotopes have reduced industry's cost of basic and applied research, simplified and improved quality control procedures, cut labor, raw material, and processing costs, and increased plant safety. They have also speeded product development and opened new avenues of scientific study."

The study reveals three primary techniques in the use of radioisotopes: 1. Gaging. 2. Radiography. 3. Tracing. One of the big reasons for resultant savings is that radioisotopes are generally less expensive than the methods and devices they replace. For instance, one shipyard substituted a few hundred dollars worth of a radioisotope for $60,000 worth of radium in its radiographic work.

• **Who Uses Them**—The paper industry is the biggest user of these cost savers (93 companies), but the petroleum refiners have reaped the greatest benefits ($11,671,158 saved in 12 months). Primary metal companies are a close second in number of users, and metalworking and allied industries account for about 30 per cent of the licensees and a little over 23 per cent of the savings. (See accompanying table.)

How 284 Companies Save with Radioisotopes*

INDUSTRIES	Uses	Net Saving†	Gross Annual Investment‡
Electrical Machinery (16 companies)	Gaging Radiography Research Mfg. & Processing	$294,036	$124,804
Electronic Components, Accessories (19 companies)	Research Mfg. & Processing	819,605	55,854
Engineering, Architectural Services (59 companies)	Radiography Research Mfg. & Processing	2,147,362	553,519
Fabricated Metal Products (45 companies)	Radiography Research	615,467	276,956
Machinery (except electrical) (26 companies)	Gaging Radiography Research Mfg. & Processing	994,938	65,283
Metal Mining (4 companies)	Gaging Research	265,451	13,368
Primary Metals (85 companies)	Gaging Radiography Research	2,238,617	427,799
Transportation Equipment (30 companies)	Gaging Radiography Research Mfg. & Processing	1,729,533	285,324
TOTALS		$9,105,009	$1,802,898

*During a 12 month period, 1957-58. Only companies supplying useful data are included.
†Difference between net annual investment and gross saving. Net annual investment is difference between cost of radioisotope equipment and equipment it replaced or would have replaced.
‡Cost of equipment and facilities, amortized in accordance with reporting companies' practices.
Source: National Industrial Conference Board.

• **Typical Savings**—Among the savings effected by the 588 companies during the 12 month period:

Raw Materials—Over $10 million, including $1,932,000 by primary metal firms.

Finished Material Scrap—$3,378,000, mostly through closer control of continuous process operations.

Productivity—$2,659,000, including $294,000 by primary metal firms.

Labor—$1,372,000, with more than one-third coming in the transportation industry.

Research—Although more difficult to measure, the difference in cost of radioisotope research projects and the same projects done by previous methods was $12,512,000, most of which was accounted for by research salaries.

Tight Money Won't Cut Inventories

DON'T WORRY about tight money adversely affecting your inventory building plans for 1960. Money will be tight and interest rates high. But with business booming, chances are you'll be able to get most if not all the short term money and credit you'll need.

That's what bankers, economists, other fiscal authorities, and purchasing agents tell STEEL in a special survey of the money market. (See table at right.)

"In a good money market, the peak annual rate of inventory accumulation could probably rise to $12 billion in one of the first two quarters," says a bank economist. "But under today's conditions, the rate may be restricted to $10 billion." A majority of the respondents feel this is not a serious restriction. And most economists feel that in the long run it will be good for the economy, tending to lessen the chances of a serious inventory hangover in 1961.

Buyers See Few Problems in Financing

(Answers of purchasing agents of basic metals and metal components to special STEEL survey)

	Basic Metals		Metal Components	
	YES	NO	YES	NO
1. Is your company's liquidity today more favorable than on July 15, 1959?	68%	32%	45.8%	54.2%
2. Do you anticipate entering the money market to finance inventory rebuilding this year?	26%	74%	20%	80%
3. If money gets tighter and interest rates higher in 1960, will your inventory plans be adversely affected?	34%	66%	20%	80%

• One of the most favorable factors in the money outlook is the improved liquidity of many metalworking companies.

That can be traced to two sources: Better profits in 1959 and the steel and copper industry strikes. Results of the survey show that buyers of basic metals are better off than component buyers. Reason: Inability to replace stocks during the strikes helped them build up reserve funds.

Because component buyers were able to maintain their inventories near peaks throughout most of the strike, their reserve funds did not build up as much. But this fact does not seem to bother them greatly. STEEL's regular quarterly survey (Jan. 4, p. 381) indicates that their inventory plans center around filling out imbalances rather than upping general stock levels.

Perhaps because of improved liquidity, only 20 per cent of the respondents to the survey will rely entirely on bank loans for inventory financing this year. Another 16 per cent say they will use company funds plus bank loans. But 51 per cent will use their own funds exclusively. The rest will use various combinations of cash and credit.

• The bankers say they are ready and able to take care of their regular customers this year regardless of all the talk about tight money.

A Midwest banker says: "Our commercial accounts are only about 50 per cent loaned out right now. We think this is below some of the eastern banks, which we hear are terribly extended."

A high Federal Reserve official in Washington tells STEEL that if money does get tighter later this year, funds to finance inventories will be the least likely to be eliminated. "Even in the tightest periods, there has been sufficient financing for this purpose," he says.

He is not certain that capital will be as scarce as some pessimists have feared. For one thing, industry profits are on an uptrend and probably will continue so throughout 1960. Secondly, the announcement that the government will operate in the black this year and next suddenly changes it from a drain on funds to a possible source.

• However, a relatively small number of companies may have trouble getting money, both short and long term, this year.

Robert O. Wendling, vice president, Credit Dept., National City Bank of Cleveland, says at least four types may run into trouble.

First, companies using the LIFO (last in, first out) method of accounting are facing heavy taxes because of the inventory reduction. This will cut into their liquidity.

Second, small companies which have not had a chance to establish sound credit lines or which are financially unsound may find some difficulties.

Third, undercapitalized companies will have their usual troubles, especially those having to carry higher inventories to meet bigger demand. That will automatically extend receivables and tie up cash.

Mr. Wendling also foresees some troubles for companies which overbought before the steel strike and extended their credit too far. "This will be an over-all good year, but it will tend to weed out the men from the boys more than usual."

• But there are other sources for money in a tight period.

If a small company has letters of refusal from two banks, it may qualify for a loan from the Small Business Administration. Or in some areas, such as New England, development corporations are springing up to handle loans that banks consider too risky. Finally, commercial factoring houses may make loans turned down by banks, especially to companies with heavy receivables.

If loans are not available, some fiscal experts feel the last resort to conserve cash is to pass up discounts. A banker declared: "I don't advocate this as a rule. Even at 0.5 per cent, this amounts to a simple interest of 6 per cent annually, which is too much to toss overboard. But if interest rates on borrowed money go much higher, it may be worth it to have the cash on hand. Remember, though, the company which starts passing up its discounts is risking its credit line."

• Interest rates, though high, so far have not posed a big problem.

Even at 5 to 6 per cent, it is possible to make money on borrowed funds in an expanding economy. But many experts see a further increase in the Federal Reserve Board's prime interest rate—probably another 0.5 per cent—and they feel that may put a damper on some inventory plans. Only a handful of the purchasing agents answering STEEL's survey indicated they would have to cut back their plans, but most of those said a 15 to 25 per cent reduction would be prompted if rates go too high or money gets too tight this year.

William E. Gombert, purchasing agent for Addressograph-Multigraph Corp., Cleveland, and head of the business survey committee of the Cleveland Association of Purchasing Agents, reports his group feels that 6 per cent money is already too expensive. "If lenders go any higher, they are liable to price themselves out of the market."

EDWARD B. MORAN

Interest Rates To Ease In Second Half

"TIGHT MONEY may be expected to continue at least through the next six months, with some possible easing by summer," predicts Edwin B. Moran, executive vice president, National Association of Credit Management. "But I do not anticipate that it will seriously curtail inventory rebuilding."

In an exclusive interview with STEEL, Mr. Moran declared: "Money, credit, and interest rates constitute the basis of all serious economic discussions today. Undoubtedly, we can expect a continued period during which interest rates will average noticeably higher. The demand for capital and credit all over the world must be added to the needs at home. You cannot successfully maintain a high level economy on low interest rates.

"There is reasonable expectation that interest rates will even out after the first half of 1960, but you can expect a tight lid on credit expansion for the next few months.

"Small and medium size companies would presently like to borrow more for inventory building. But few will. And the majority will not be able to, due particularly to the lack of available lendable funds.

"Those requiring increased borrowing for inventory buildup may be able to obtain some relief through factoring houses and commercial finance companies. Some of the large concerns are obtaining loans through insurance companies.

"In a recent survey of over 100 concerns, many companies indicated they are improving their liquidity for this purpose by closer control of accounts receivable. In several instances, we know of companies that have reduced their outstanding receivables by 10 to 15 per cent without loss or jeopardy of sales volume.

"Financing, judging from the survey, does not appear to be a prime problem. About 3 in 10 men expect heavier financing requirements, with the same number seeing those needs lighter in 1960. The balance expect fiscal requirements in 1960 to remain about the same as last year's. And only about 1 in 10 expects greater collection problems on the anticipated swelling of receivables."

Marketing Your 'Hidden Extras'

No longer just a necessary evil, customer service has joined the marketing staff to open new markets and develop new products

YOU CAN make "hidden extras," or customer services, help sell your product line. If you take a marketing approach to your customer relations, you will see your volume climb.

That is what STEEL hears from a growing number of manufacturers in the more standardized, highly competitive industries. Some see the approach as merely offering additional services to distinguish themselves from the competition. Some explain it as a logical extension of marketing research, from discovering what a customer will buy to assisting him in finding out what he can sell. Others have embarked on broad programs of customer emphasis which are designed, in the long run, to make the supplier "look like a leader in his industry."

Running customer service schools is a marketing function at Reliance Electric & Engineering Co., where these students are learning equipment maintenance

• Behind the new emphasis is a change in the direction of industry thinking.

One eastern manufacturer has carried the concept to his production people by revamping department names. Quality control personnel now work in the "customer representation" department, while the final inspection function has become "customer acceptance." What the new thinking amounts to, says one industry source, is "a switch from an industry or manufacturer's orientation to customer orientation."

In the highly competitive fastener industry, producers have fashioned customer engineering into a sharp selling tool. One nut and bolt maker guarantees prospective buyers that he will cut their fastener costs by 25 per cent after analyzing their products. Another has taken customers' products, such as refrigerators and automobile brakes, into his own plant, stripped them down into components, and redesigned the assemblies so as to cut costs on fastener applications.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., in a typical situation, found itself to be one of three fastener suppliers to a large consumer manufacturer, with only 25 per cent of his total fastener business. After going into the customer's plant, analyzing his fastener usage, and suggesting improvements, RB&W won 50 per cent of his business.

• In the material handling equipment field, where customer specials have reached full flower, a wry industry joke is that "there is no such thing as a standard lift truck anymore."

Despite the implication that special designs for individual applications are a necessary evil in the industry, at least one official feels that customer engineering is "a real selling tool." C. L. Fell, president of the Material Handling Institute and vice president - marketing, American Monorail Co., Cleveland, says his company has often supplied its plant design and layout services to customers. He further predicts: "Technologically, there is a decided trend toward more completely engineered material handling installations." It means that more equipment makers will add broader engineering services.

• One manufacturer takes its customers back to school for technical training.

Reliance Electric & Engineering Co., Cleveland, offers five day training sessions in its home office or customers' plants for personnel who operate or service Reliance motors, drives, and controls. The training sessions are not just basic button pushing, explains Frank Hrabak, customer service school director. "We don't even talk Reliance, as such; we find that the greatest need is to raise the general level of electrical and electronic knowledge," he says. "We start with Ohm's Law and devote three days to basic theory alone."

The service schools, which oper-

ate under Reliance's Marketing Services Dept., do more than just boost the company's sales. Besides keeping sales engineers selling, Reliance has gained a service edge which other manufacturers have had to emulate.

• The buyer need no longer beware. Sellers are seizing on failures and misapplications as marketing opportunities.

Another fresh concept is in the marketing approach to customer service being adopted by Modine Manufacturing Co., Racine, Wis. Cary Wilson, vice president-sales, explains: "It seemed to us that if we could organize the introduction of a new product or develop a campaign to sell stock items successfully, we could do the same for product service. We developed a marketing plan for the service department, integrating and co-ordinating it with sales, but still maintaining it as a separate function.

"Shortly after we put this plan into operation, we ran into an epidemic of noisy gas unit heaters. We found that the complaints were mainly concerned with vibrations due to motor hum where heaters in the South were being used in school classrooms. Since our units had been designed for industrial and commercial installations where heat throw is more important than quietness, this was a misapplication of the product. Our entire marketing team went to work to resolve the problem.

"Engineering designed a new shock mounting to isolate vibration and reduce noise. Manufacturing pulled all units out of stock and added the insulator; servicemen worked around the clock to correct the school units. As a result of the misapplication and the corrective marketing operation, we improved the product, acquired a new market and new use of the product, and added new customers."

Mr. Wilson feels that sweeping new quality control programs being instituted in the auto industry will have a tremendous impact on industry's customer relations. "If industry in general adopts this program, we will require better salesmen and smarter servicemen because customers' service managers and quality control experts will now be on the buying team."

How '60 Capacity Is Divided

Steel ingot total up 937,300 tons last year reaching 148,570,970 tons. Rise is thirteenth in succession, AISI reports

Process	Capacity in tons Jan. 1, 1960	Change in tons from Jan. 1, 1959
Open hearth	126,621,630	Up 93,250
Electric	14,395,940	Up 900,810
Oxygen	4,157,400	Up 124,240
Bessemer	3,396,000	Down 181,000

Companies	Total annual capacity (net tons)
Acme Steel Co.*	452,000
Acme-Newport Steel Co.	608,000
Total	**1,060,000**
Alan Wood Steel Co.	800,000
Alco Products Inc.	108,650
Allegheny Ludlum Steel Corp.*	912,000
American Compressed Steel Corp.	21,600
Armco Steel Corp.*	4,405,000
Sheffield Div.*	2,345,000
National Supply Co.	50,000
Total	**6,800,000**
Atlantic Steel Co.†	325,000
Babcock & Wilcox Co.*	321,730
Baldwin-Lima-Hamilton Corp.	188,710
Berkman Co., Louis:	
Ohio River Steel Div.	136,080
Bethlehem Steel Corp.:	
Bethlehem Steel Co.	22,000,000
Pacific Coast Div.	1,000,000
Total	**23,000,000**
Borg-Warner Corp.:	
Calumet Steel Div.*	117,500
Ingersoll Steel Div.	64,000
Total	**181,500**
Broeburn Alloy Steel Corp.	20,730
Byers Co., A. M.	90,000
Cabot Shops Inc.*	18,000
Cameron Iron Works Inc.	58,800
Carpenter Steel Co.	87,500
Carpenter Steel of New England Inc.	84,000
Total	**171,500**
Ceco Steel Corp.*	150,000
Colorado Fuel & Iron Corp.	2,601,500
Roebling's Sons Div., John A.	235,000
Total	**2,836,500**
Columbia Tool Steel Co.	6,600
Continental Steel Corp.	420,000
Copperweld Steel Co.	660,000
Crucible Steel Co. of America*	1,433,180
Detroit Steel Corp.†	1,000,000
Eastern Stainless Steel Corp.†	72,960
Edgewater Steel Co.	117,600
Erie Forge & Steel Corp.	284,000
Finkl & Sons Co., A.	33,600
Firth Sterling Inc.	20,040
Florida Steel Corp.*	51,000
Ford Motor Co.*	1,940,000
Granite City Steel Co.	1,440,000
Harper Co., H. M.*	11,700
Harrisburg Steel Co. division of Harsco Corp.	100,750
Heppenstall Co.	55,550
Midvale-Heppenstall Co.*	175,000
Total	**230,550**
Industrial Forge & Steel, Inc.†	79,200
Inland Steel Co.	6,500,000
International Harvester Co.	1,200,000
Isaacson Iron Works	102,000
Jessop Steel Co.	35,800
Green River Steel Corp.	183,190
Total	**218,990**
Jones & Laughlin Steel Corp.*	8,125,000
Joslyn Mfg. & Supply Co.	37,500
Judson Steel Corp.	76,500
Kaiser Steel Corp.	2,933,000
Keystone Steel & Wire Co.*	600,000
Kilby Steel Co.	34,020
Knoxville Iron Co.	38,000
Laclede Steel Co.	600,000
Latrobe Steel Co.	24,000
LeTourneau Inc., R. G.	90,000
Lone Star Steel Co.	800,000
Lukens Steel Co.	930,000
McLouth Steel Corp.	2,040,000
Merritt-Chapman & Scott Corp.:	
Milton Steel Div.*	110,000
Mesta Machine Co.	171,000
Mississippi Steel Corp.	45,000
National Forge & Ordnance Co.	25,000
National Steel Corp.:	
Great Lakes Steel Corp.	3,700,000
Weirton Steel Co. Div.	3,300,000
Total	**7,000,000**
Newport News Shipbuilding & Dry Dock Co.	15,000
Northwest Steel Rolling Mills Inc.	53,000
Northwestern Steel & Wire Co.	825,000
Oregon Steel Mills	150,000
Pacific States Steel Corp.*	265,000
Pencoyd Steel & Forge Corp.	15,600
Phoenix Steel Corp.	846,760
Pittsburgh Steel Co.*	1,620,000
Porter Company Inc., H. K.:	
Connors Steel Div.*	267,000
Vulcan Kidd Steel Div.	9,600
Total	**276,600**
Republic Steel Corp.	12,742,000
Roanoke Electric Steel Corp.	25,000
Sharon Steel Corp.*	1,963,000
Simonds Saw & Steel Co.	21,600
Southern Electric Steel Co.	66,000
Southwest Steel Rolling Mills*	100,000
Texas Steel Co.*	192,280
Timken Roller Bearing Co.	700,000
Union Electric Steel Corp.	25,000
United States Steel Corp.:	
United States Steel Corp. (Central Operations)†	28,944,000
American Steel & Wire Div.	1,988,000
Columbia-Geneva Steel Div.*	2,917,000
National Tube Div.*	4,070,000
Tennessee Coal & Iron Div.	3,997,000
Total	**41,916,000**
Universal-Cyclops Steel Corp.	77,410
Empire-Reeves Steel Corp.	500,000
Total	**577,410**
Vanadium-Alloys Steel Co.	12,000
Colonial Steel Co.	30,000
Total	**42,000**
Washburn Wire Co.	93,000
Western Rolling Mills Div. Yuba Consolidated Industries Inc.	60,000
Wheeling Steel Corp.	2,400,000
Wickwire Bros. Inc.†	28,730
Youngstown Sheet & Tube Co.	6,750,000
Grand Total	**148,570,970**

*Capacity is up.
†Capacity is down.
Source: American Iron & Steel Institute.

Steel Peace: Mostly Politics?

POST MORTEMS on the steel settlement are proving as difficult to reconcile as the positions of management and labor during the dispute itself.

Roger Blough, chairman, U. S. Steel Corp., announced Jan. 4, the day of the settlement, that "it was imposed upon us—not by government—but by circumstances . . ." The circumstances included the agreements previously reached between the United Steelworkers and Kaiser Steel, the aluminum industry, and the can industry—all of which granted the union more than the 11 negotiating steel companies were willing to give. It was obvious that David McDonald, Steelworkers' president, would lead his members in another walkout after the Taft-Hartley injunction period expired. Finally, it was recognized by all concerned as a political fact of life that the U. S. Congress would act to keep the steel industry working.

A little noted but significant factor: The possibility that Mr. McDonald would change tactics and strike only a few of the negotiating firms. (He hinted at the move in his final appearance before Dr. George Taylor's Steel Fact Finding Committee.) A selective strike might have avoided Congressional action (although it's doubtful), but the few firms involved would have been faced with a competitive situation that radically differed from the one they had with 85 per cent of the industry on strike.

Not to be discounted in analyzing the settlement is the realization of the Steel Companies Co-ordinating Committee that it had lost the public relations fight. Formal and informal polls alike indicated the union members would vote against accepting the last offer of industry in the Jan. 11 election scheduled by the National Labor Relations Board.

If the union had walked out again on Jan. 26, President Eisenhower would have most likely sought legislation to extend the injunction. Then a fact finding committee (with the power to make recommendations) or an arbitration board would have been appointed to seek a settlement. Who would have manned the new committee or board? In Washington, it was a foregone conclusion that Dr. Taylor would be the chairman. The steel industry's reluctance to take its case to Dr. Taylor a second time may have been a factor.

Nixon's Gambit

In Washington, observers were well aware of the political implications of the strike. From the start, Secretary of Labor James Mitchell had watched deliberations closely (formally, as the official reporter to the President on what was going on within the area controlled by Federal Mediator Joseph Finnegan; informally, from the point of view that the Republican National Committee dictated). Vice President Richard Nixon didn't appear on the scene as a dominant factor until he returned from his Russian trip. He saw little progress in the negotiations and determined to insert his office and personality directly into the fight. After all, his candidacy for the Presidential office was at stake.

Picking up Secretary Mitchell's operation, almost as an afterthought, Vice President Nixon established close contacts with the USW prexy (with whom he has maintained close social relations for a number of years); then he called in Mr. Blough.

The Veep knew he could handle Mr. McDonald. As a master chess player analyzes his position, he decided to directly attack the king (Mr. Blough). He argued that the industry had nothing to gain by continuing the strike: Mr. McDonald had indicated that the longer he was made to wait, the more he would ask. Mr. Nixon further argued that the industry could do nothing but harm to the Republican party's chances in November, 1960, by inviting Congress to act.

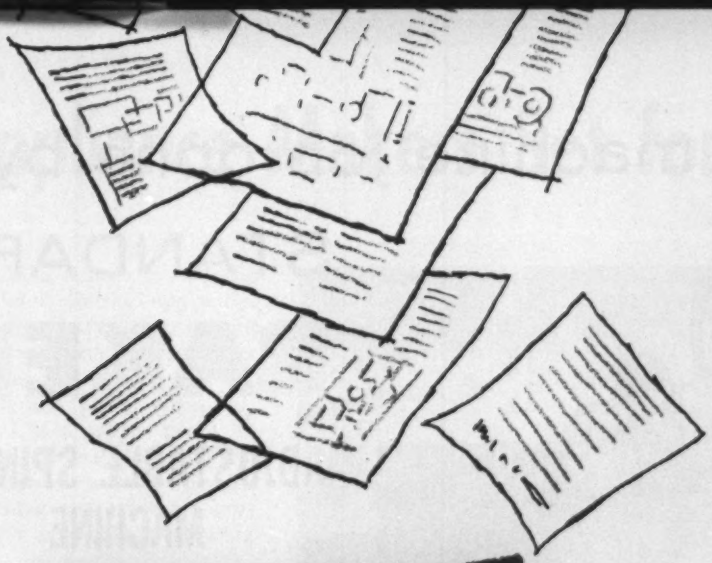
Secretary Mitchell noted at the end: "Without the vice president, we would not have had a settlement."

Democrats Charge Collusion

Democratic leaders answered the settlement with the charge that Mr. Blough and Mr. Nixon had sold each other a bill of goods. The steel industry (claiming the need for profits to re-equip and lower costs to meet foreign competition) has gained the right to raise prices, say the Democrats, because the settlement was not "voluntary."

The Republicans, conclude the Democrats, offered the industry the chance to raise prices after the November election to secure a settlement without risking action by Congress against both the union and management.

The settlement also eliminated the chance of a strike-forced recession during a Presidential election year—a year when the Republican party needs every vote to bring its candidate home.



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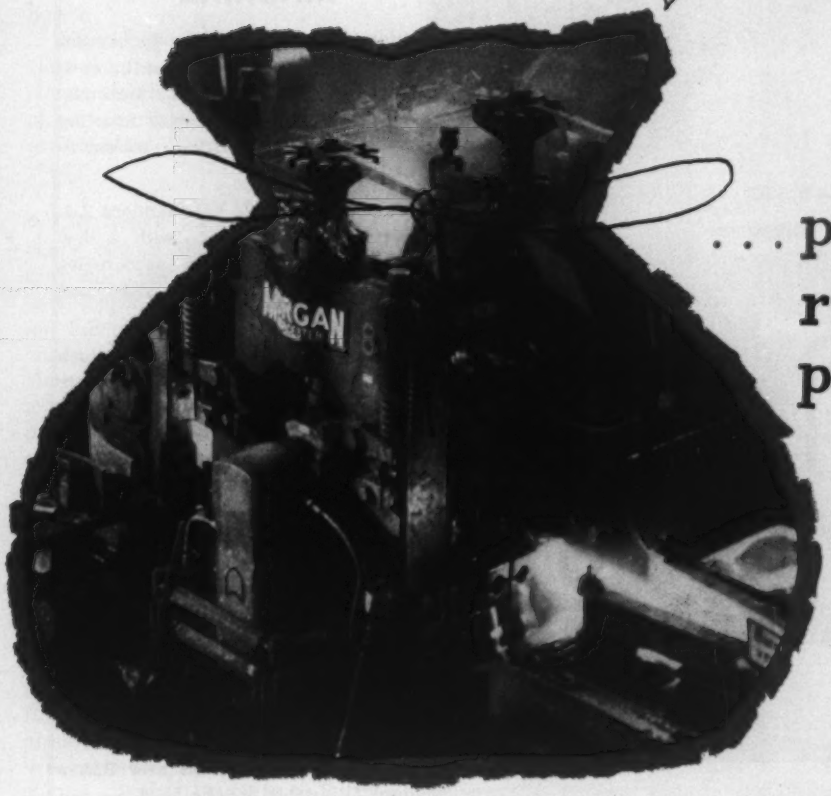

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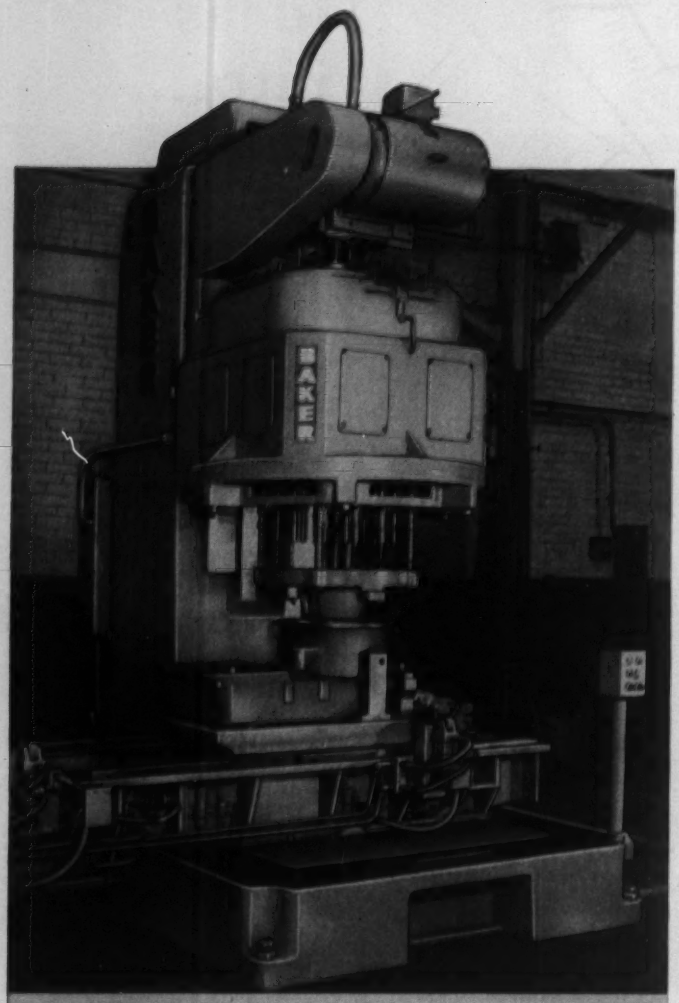

Baker A-24-VU Adjustable Spindle Machine with standard 36" round universal head and standard slip plate bored for 46 spindles.

ADJUSTABLE SPINDLE MACHINE

An automotive contractor's production did not allow for a special machine to work on heavy, hard-to-handle truck transmission housings. Conscious also of retooling costs, the contractor took his problem to the BAKER engineers.

THE RESULT: This A-24-VU Standard Adjustable Spindle Machine, with a few special adaptations. Only accessories added: slip plate, bushing plate and transfer, including pallet.

The work piece is held on a pallet which transfers it from prior operations where the top flange of the housing is completely machined. The BAKER drills 2 sets of bolt circle holes on the top flange and 1 set at the housing bottom. A bushing plate, supported on the slip spindle plate, guides the drills and targets into bushings on the pallet for positive location.

Using this BAKER Standard, the contractor saved special machine costs, gained the high production needed and found it simple to take the BAKER out of the transfer line and use it for other drilling and tapping operations.

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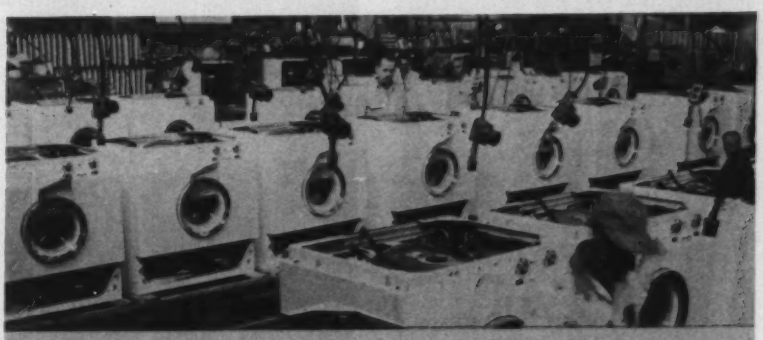
Appliance Makers Set for '60 Surge

LOOK FOR a 5 per cent increase in 1960 sales of electrical appliances, thanks to some fast work to prevent another blown fuse in steel labor negotiations.

Although they put a billion dollars instead of a copper penny in the fusebox, Messrs. Mitchell and Nixon prevented a steel shortage from knocking out appliance production and consumer purchasing power.

Welcoming steel peace, Maytag Co.'s president, Fred Maytag II, declares: "Settlement of the strike removes the largest single obstacle to increased business activity in 1960."



Factory Shipments of Electric Appliances

(Units)

	1960	1959	1958
Automatic and Semiautomatic Washers	3,157,000	2,980,000	2,781,038
Dishwashers	575,000	525,000	424,700
Electric Dryers	981,000	920,000	823,522
Home Freezers	1,200,000	1,200,000	1,100,900
Ranges (including built-ins)	1,750,000	1,680,000	1,354,500
Refrigerators	3,800,000	3,750,000	3,116,700
Washer-Dryers	255,000	200,000	168,375
Wringer Washers	821,000	915,000	891,311

Sources: National Electrical Manufacturers Association; American Home Laundry Manufacturers Association.

• **Last Year's Gains**—Beating last year's factory shipments by 5 per cent will take some doing because they topped 1958's by 14 per cent for the second largest volume in history. The National Electrical Manufacturers Association (NEMA) reports that shipments of built-in ranges, dishwashers, and food freezers reached new peaks. Built-in ranges led all appliances with a 38 per cent gain, followed by dishwashers, up 24 per cent.

• **More in Store**—Taking a bullish view of prospects for 1960, Judson S. Sayre, president of Borg-Warner Corp.'s Norge Div., predicts that industry sales "will jump nearly 10 per cent." John W. Craig, vice president and general manager of Westinghouse Electric Corp.'s appliance divisions, expects a 5 per cent gain, as does Mr. Maytag.

The American Home Laundry Association forecasts a 4 per cent pickup, while NEMA, traditionally conservative, predicts 3 per cent. Whirlpool Corp. looks for a "relatively small" increase in industry shipments.

The Commerce Department says the retail value of manufacturers' sales will reach an all time high of $5.35 billion this year, surpassing last year's total by 7 per cent. The Business & Defense Services Administration notes that 1959 sales would have set a record if the appliance industry had kept its 1958 share of the consumer's dollar. In 1958, the ratio of manufacturers' sales of appliances to personal consumption expenditures for durable goods was 12.2 per cent. Last year, it slipped to 11.5 per cent.

• **Why They're Hopeful** — Appliance makers are optimistic because: 1. Many of the ranges, refrigerators, and washers that were bought in 1947, the first big postwar year, are ready for the scrap heap (a major appliance has a useful life of about 13 years). 2. Consumers, with record incomes, will spend about 12.5 per cent more for durable goods than they did last year. 3. Population and households are on the upswing.

• **This Year's Leaders**—Shipments of all major electrical appliances except food freezers and wringer washers will probably surpass last year's figures. (GM's Frigidaire Div. forecasts a "slight" increase for freezers, but NEMA's industry survey shows no change.) Wringer washers are slated for a 10 per cent drop. NEMA predicts that the biggest gain (28 per cent, from a low base) will be scored by washer-dryers. Parker H. Ericksen, vice president and general manager of Murray Corp.'s Easy Laundry Appliances Div., looks for a 75 per cent jump (from 200,000 to 350,000) and says even that may be "conservative." Dishwashers, dryers, built-in ranges, and automatic washers will also do well, posting

6 to 9.5 per cent gains. For the first time, built-in ranges (800,000) will give free standing types (950,000) a good run for leadership.

• **Fewer Housing Starts**—Because mortgage money will be tight this year, most forecasters predict a drop of about 11 per cent in housing starts, from last year's 1.35 million to 1.2 million. That is the one big deterrent to appliance sales. Somewhat paradoxically, appliance men are predicting a 6.7 per cent gain for built-in range shipments in the face of the housing decline. A General Electric Co. executive explains that built-ins will make a greater penetration of the new construction market. "Last year, about two-thirds of the new houses had gas or electric built-in ranges," he estimates. "This year, better than four out of five will have them."

• **Innovations**—"I'm not so sure that the appliance industry has been as successful with innovations as it might have been," a marketing executive confides. "People don't jump into the market because of new features. They buy when something old wears out." In an effort to change that, appliance men are pushing:

• Refrigerators with self-defrosting freezer compartments.
• Portable dishwashers.
• A refrigerator with a center drawer for meat and vegetables that can be pulled out without opening doors to other compartments.
• A range with sensing units in heating coils that can "read" and adjust temperatures in pans.
• A single control automatic washer with pushbuttons for various fabrics.
• A $600 range designed for backyard barbecues.
• An 18 cu ft, $800 refrigerator with a freezer affording minimum air movement, maximum humidity, and constant temperature at the threshold of freezing.

Appliance makers say their profit margins were better last year than in 1958. Reasons cited include: Better production planning, cost control, product design, and a trend toward more sales of higher price units.

Manufacturers note signs of greater retail price stability. Discounting, while still a problem, is not as troublesome as it was.

Professional labor negotiators like

Expertness in the art of contract bargaining

Wealth of knowledge on law and contract patterns

Industry Hires Bargaining

YOUR LABOR CONTRACT is as big a factor in keeping you competitive as your production facilities.

That's why it may pay you to check the advantages of bringing in a professional labor negotiator to assist in reaching agreement on terms of your next contract. The professional bargainer is coming into his own for two big reasons:

1. Labor contracts are getting more complex. Labor law is growing more involved. The myriad of subjects and details included in the modern labor pact is mushrooming —the checklist on Page 64 shows why.

2. Bargaining is getting tougher. Not only must the negotiating team be well steeped in facts and figures to support its arguments, it must be equally adept in the *art* of bargaining when presenting its case.

Giant corporations can usually muster from within their own ranks the necessary experts to prepare for and conduct their negotiations. Small firms can generally conclude their relatively simple contracts with little outside assistance.

• **Bargaining vs. Administering**—But more and more firms between those extremes are turning to the professional labor negotiator at contract time. And proponent companies are quick to point out that such a move is not a reflection on the ability and caliber of their industrial relations staffs.

The industrial relations manager and his staff in most firms are experts in administering the labor contract and settling the week to week problems that arise. Few, however, are expert bargainers, primarily because they don't gain enough experience in hammering out but one contract every year or two.

Another factor: The average industrial relations manager is too busy and doesn't have the staff to keep pace with all the details of changing labor laws and area and national contract settlements.

Raymond F. Vacha, industrial relations director of the Associated

Ray Vacha can bring to your bargaining table . . .

Ability to assume the role of the scapegoat

An intermediary's objectivity to gain a fair settlement

Respect by the international union rep as an equal adversary

Skill to Help Trim Contract Costs

Industries of Cleveland, is a typical member of this growing corps of professionals. He bargains 100 to 150 contracts annually for AIC members and provides information and counsel for another 150 firms doing their own bargaining.

Employer associations are not the only place to look for the professional; many are associated with management consultants or operate as independent labor counselors. Most got their start on company industrial relations staffs.

• **He's an Expert**—The one big advantage of the professional negotiator is the information he has at his fingertips. He has a staff to keep him up to date with area contract settlements (many of which he settled personally), national settlements, current labor cases and their rulings, and changing labor laws.

"Bargaining, like acting, is an art when the face to face sessions get underway," relates Mr. Vacha. "You can bet that the international union representative sitting across the negotiating table is an expert on bargaining technique—he has to be or he couldn't have risen to that position in the labor ranks. And the professional negotiator, if he's worth his fee, is equally skilled."

A further point: The union rep is more apt to accept the professional bargainer as an equal adversary than a company manager who bargains part time.

In management's favor is the fact that the professional negotiator and the union's international representative have probably battled out settlements in several other area firms in recent weeks. Respect is established at the outset of the negotiations, and no time is lost by union and company negotiators testing one another's knowledge and bargaining skill.

• **Role of the Intermediary**—The professional negotiator can be more objective in getting the best contract possible. His career is not subject to the whims of a top company official who has his own idea about bargaining. More than one president has cost his company money through a needless strike or bad clause because of an emotional explosion in dealing with those "so and so union guys who've never had to meet a payroll."

"When union demands get out of line," says the AIC negotiator, "a professional is in the best position to point it out to the union rep—he knows the professional speaks from experience in other negotiations."

• **Convenient Scapegoat**—One of the undesirable byproducts of contract negotiations is that the participants often carry the heat of the bargaining table out of the negotiating room into the plant after agreement is reached. Conflicts are renewed over minor issues and contract administration becomes difficult.

Skillful handling of bargaining table skirmishes puts the brunt of the conflict onto the professional

Negotiating a labor contract gets increasingly complex

The Bargainer Needs a Working Knowledge

. . . of the law

- Taft-Hartley Act
  - Federal Mediation & Conciliation Service
- Federal wage and hour laws
- Public Contracts Act
- Fair employment practices laws
- State minimum wage laws
- State labor relations laws
- Social Security Act
- Workmen's compensation laws
- Unemployment compensation laws
- Federal and state safety laws

. . . of current patterns in contract provisions

- Union-management rights
- Grievance procedures
- Arbitration procedures
- Work stoppages, slowdowns, strikes
- Boycotts
- Vacations, holidays
- Pensions
- Insurance—life, medical, sickness, and accident
- Discipline
- Hours for women
- Apprentice training
- Job description, classification
- Incentive systems
- Hours of work
- Seniority provisions
- Shift premiums
- Overtime procedures
- Layoff and recall
- Subcontracting work
- Union committees
- Pay for time spent in grievances and negotiating
- Severance pay
- Travel allowances
- Reporting-in pay
- Lunch periods
- Union shop
- Dues checkoffs
- Cost of living
- Promotions
- Hiring procedures
- Area practices concerning:
  - Rest periods
  - Coffee breaks
  - Washup, cleanup time
  - Pay for jury duty
- Jurisdictional disputes

and avoids renewal of personality clashes after contract signing.

"As outsiders, we can also point out to the union that the industrial relations manager is doing a tremendous job and bending over backward to be fair," emphasizes Mr. Vacha.

How you can best use the professional labor negotiator depends upon your own individual situation. Some firms are turning over the full bargaining responsibility to the professional; others use him chiefly in consulting roles, either behind the scenes or at the bargaining table.

● **Pitfalls Also** — But the employment of a professional negotiator has pitfalls too. The major one: Abdication by management of its basic responsibility for the terms of the contract.

Company officials are in the best position to determine what provisions are needed to best fit the firm's activities—the professional can only offer his knowledge and experience as guidance and advice. It's the company officials who'll have to pay the costs and administer the contract in day to day operations.

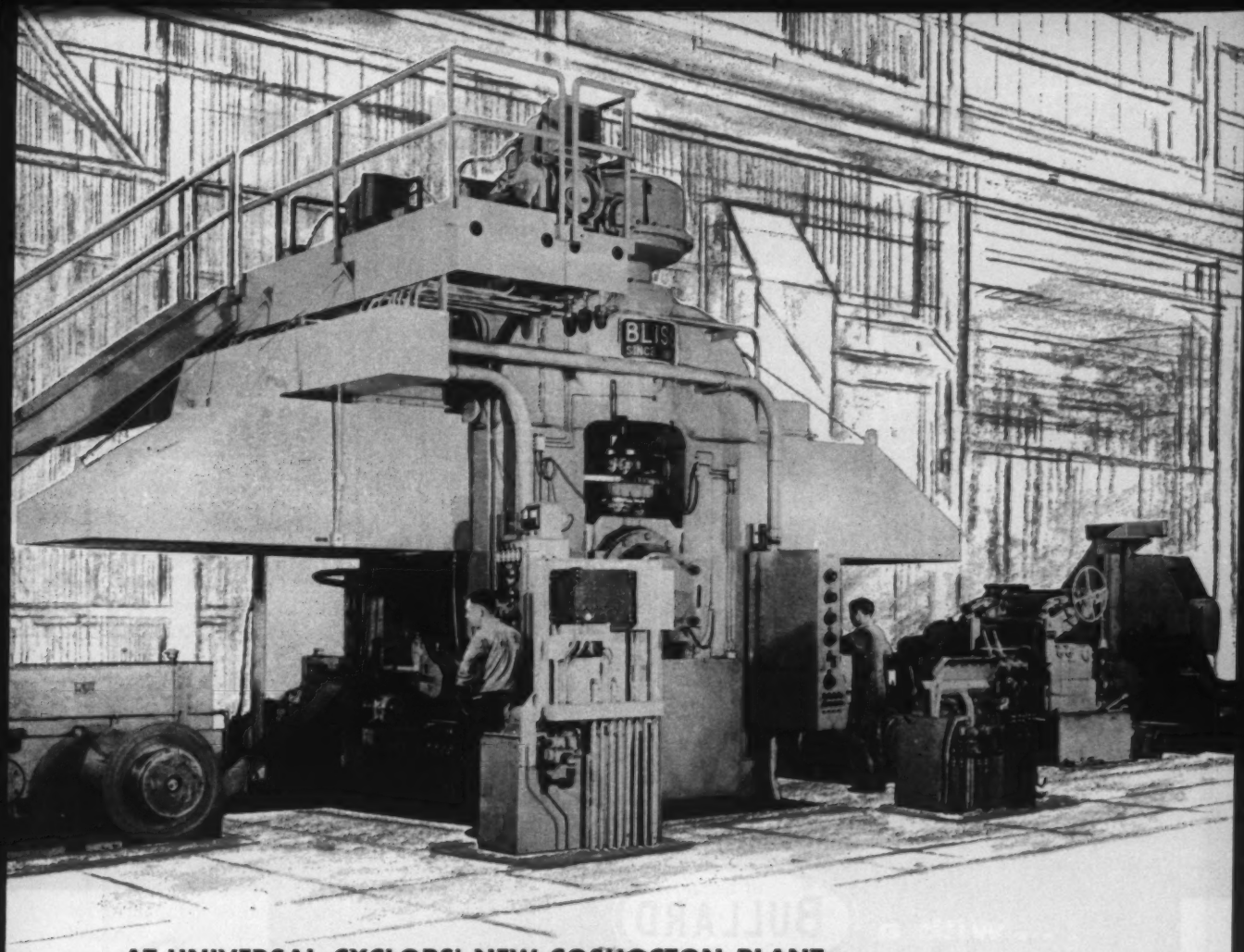
That's why the professional negotiator will insist upon the foremen, superintendents and industrial relations staff doing the advanced planning on what's needed in the upcoming contract. Within this framework then, the professional can suggest possible approaches to solve the problem based on his knowledge of how other companies handle the contract provisions.

Another plus factor in calling in a professional negotiator is that many are also associated with insurance and pension specialists. Fringe benefit costs vary from firm to firm and trying to match another's package can be expensive. A good example: Pension provisions won by the steelworkers may be prohibitively expensive for many medium and small size firms.

When you make a mistake in labor negotiations, you have to live with it for at least the life of the contract. Even then, it generally costs you something to get it corrected at the next session. Like the engineering and management consultant, the professional bargainer can help you keep competitive by avoiding the mistakes.

Ray Vacha and the other professionals offer this bit of advice for free: "Remember. There's nothing in the labor contract that's *not* economic!"

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



AT UNIVERSAL-CYCLOPS' NEW COSHOCTON PLANT:

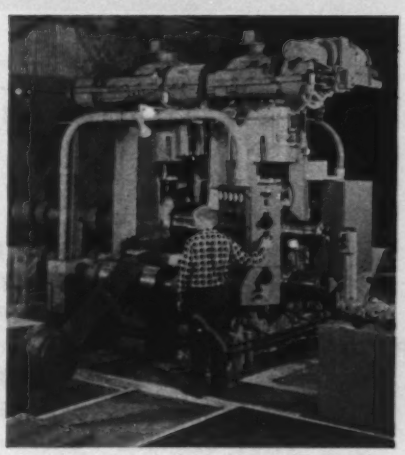
Stainless gets a fine finish fast

All the rolling at Universal-Cyclops Steel Corporation's new stainless strip finishing plant at Coshocton, Ohio, is accomplished on two rolling mills designed and built by Bliss' Rolling Mill Division. Steels rolled include all standard AISI grades in widths up to 24 inches.

Workhorse of the two mills is the 4-high reversing mill shown above. It is ruggedly built to stand heavy rolling stresses developed at speeds as high as 1000 fpm. Auxiliary equipment includes a three-stop coil entry ramp, coil buggy and mandrel-type payoff reel, flattener and feed roll, tension reels and coil buggies.

The two-high Bliss temper mill (right) is used principally for straight chromium grades of stainless providing proper hardness and a lustrous finish to the strip. An unusual design feature is the absence of an entry guide box, eliminating a source of dirt accumulation and strip scratching.

These two mills at Universal-Cyclops are typical of the modern approach to rolling mill design you'll find at Bliss. For other examples of our work, write us today for your complimentary copy of the 84-page Bliss Rolling Mill Brochure, Bulletin 40-B.



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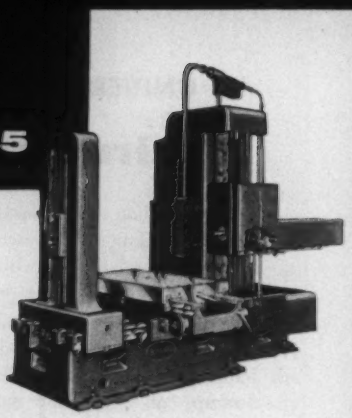

The Gas Turbine Department of the General Electric Company, Schenectady, N.Y., recently installed a Bullard Horizontal Boring Machine, Model 75. We are confident that they got more for their money.

This "*MORE" includes: —

GREATER RIGIDITY — heavier cuts at higher speeds.

PRECISE ACCURACY — hold boring tolerances to .0005.

TABLE OUTBOARD SUPPORTS — provides work alignment even with unbalanced table load.

PENDANT CONTROL — full machine control from position most advantageous to operator.

CHROME HARDENED WAYS — on Bed and Saddle for longer wear.

BED LEVELS — built into Bed for easy checking.

FAST SERVICE — after two years of operation, little trouble, and minor complaints handled promptly.

Investigate and compare and you, too — will discover you get more for your money with a Bullard H. B. M., Model 75.

ASK YOUR BULLARD SALES ENGINEER OR WRITE FOR FULL SPECIFICATIONS TO.....

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

Uniformity on Exhaust Laws Pushed

National committee will study conflicting statues and make recommendation on location of tailpipes. The payoff will come in smog control, safer cars, lower costs

ONE DAY SOON, automakers may be able to relocate exhaust systems wherever it seems safest and most economical.

A continuing movement on the part of the Automobile Manufacturers Association to assist state vehicle departments in revising laws and regulations on exhausts is getting backing from the National Committee on Uniform Traffic Laws & Ordinances. The committee is planning to hold preliminary hearings within 60 days looking toward formulation of uniform exhaust regulations in state vehicle codes.

Basing of state regulations on performance rather than design standards would permit changes in body, engine, and muffler systems, which suppliers now hesitate to make because of legal restrictions.

• **Background**—The case for moving mufflers to the front of the car was discussed in STEEL (July 13, 1959, p. 69). Engineers indicated that this likely would mean tailpipes exiting from the front or side of vehicles instead of from the rear. Developments in body and engine designs, need for antismog devices, and the continuing need to cut costs made relocation of mufflers and tailpipes seem desirable for many types of cars.

At that time, the AMA informed STEEL that statutes in California, Connecticut, and the District of Columbia make exhaust to the rear of passenger cars mandatory. The Automotive Exhaust Research Institute (members include muffler and tailpipe producers) challenged the AMA statement. It claimed 13 states required that exhaust gases be carried to the rear of vehicles. Faced with an apparent contradiction, STEEL surveyed the states to find out what the laws did say.

• **Checkup**—With the aid of the American Association of Motor Vehicle Administrators, it was determined that while none of the states requires by statute that exhaust gases be carried to the rear of passenger cars, ten states and the District of Columbia do have administrative regulations including such a requirement. The states are Georgia, Maine, New Hampshire, New Jersey, New Mexico, Pennsylvania, Rhode Island, Utah, Washington, and West Virginia. Connecticut had a similar law, but the 1959 legislature amended it to read that exhaust pipes shall be "directed toward" instead of "carried to" the rear of the vehicle.

Although the difference between laws and regulations seems slight, it makes quite a difference if any revisions are contemplated. Laws can only be changed by legislative vote. Regulations may be altered by the decree of departmental administrators. The AMA would like to see regulations based on performance rather than the present design standards. The same attitude is expected to be taken by the group that hopes to develop a model regulation on exhaust locations for the uniform vehicle code.

• **Difference**—The AMA points out that most of the present regulations governing tailpipe placement were written in the early 1900s when mufflers mounted beneath cars and tailpipes extending to the rear were the best and safest design systems available. Modern cars are considerably different from their early predecessors. They may be safer if mufflers and tailpipes are relocated.

To prove that, the automakers' association has developed test procedures to show how many parts of carbon monoxide per minute enter passenger compartments with exhausts mounted in different locations. Reporting on the tests to the motor vehicle administrators, Ford Motor Co.'s J. M. Chandler, says: "There is at least one good exhaust location for each particular design of vehicle. However, no one exhaust location has been found which would give optimum results on all vehicle designs." In some test cars it was discovered that more carbon monoxide (CO) entered passenger compartments from con-

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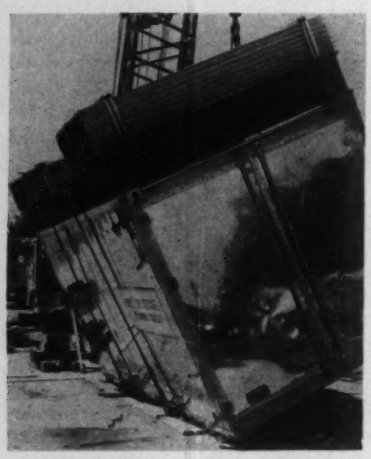
ventionally placed tailpipes than from exhausts located ahead of the front wheels."

• **Proposals**—The tests have given the AMA ammunition to help revise state regulations so they'll be based on performance, not design standards. Tentative proposals include four performance criteria: 1. The maximum permissible heat of exhaust gases should be clearly stated. 2. The direction of exhaust emissions should not endanger pedestrians. 3. Regardless of location, there should be a specifically stated maximum permissible concentration of CO in the passenger compartment (some CO always is present). The location and direction of exhaust gases should be such that they won't be taken directly into the air intake systems of following vehicles.

Judging from STEEL's survey, no state would object to such changes as long as it can be demonstrated that revised regulations would improve or maintain exhaust system safety. The District of Columbia appears to be most adamant about revision. Its reason: Side mounted exhausts might be deflected against pedestrians standing on midstreet traffic islands. California may have the answer to that. Its regulations state: "The exhaust gases from a motor vehicle shall not be directed to the side of the vehicle between 2 and 11 ft above the ground." Side exhausts located lower than 24 in. would be legal.



ALUMINUM CONTAINER is being tested for its resistance to a 30 degree roll under a heavy roof load before going into fishyback service aboard Grace Line ships. Grace Lines is buying 1500 of the cargo containers, which carry sealed cargo by truck, train, or ship. Designed and fabricated by Highway Trailer Co., the lightweight containers are made of sheets rolled by Aluminum Co. of America at its Alcoa, Tenn., works

Ford's Outlook for '60s

Normal rate of new car sales will be close to 7.5 million units a year by 1965, says Henry Ford II, president, Ford Motor Co. He adds that the normal placement demand for automobiles will pass the 5 million figure early in the decade. A new truck market approaching 1.5 million units annually will be seen by 1970. The over-all proportion of two and three car families will increase from 12 per cent of total car owners now to 15 or 16 per cent by 1965.

Compacts' Share 22.7%

There's no question that the six U. S. built compact cars will be successful this year. One reason for their acceptance is given by Ben D. Mills, general manager of Ford's Lincoln-Mercury Div. "If there is a common denominator among today's automobile buyers, that denominator is economy. We as yet have no assurance as to the outcome of this revolution," he asserts.

The smaller automobiles already are aiming at standard size Fords, Chevrolets, and Plymouths. First quarter production schedules have the compacts taking 22.7 per cent of industry output, according to *Ward's Automotive Reports*. At the same time, planned production for the former low price Big Three cars is down to 45.8 per cent from 56.4 per cent last year and 62 per cent in 1958.

Falcon sales are indicative. Since its October introduction, 85,000 have been sold. Some 30,000 were delivered in December alone. First quarter output schedules have been increased 23 per cent over the last quarter of '59. The Falcon wagon will be introduced in March. By that time, four assembly plants will be building Ford's compact car.

GM's Chevrolet Div. is working hard to catch up after lack of steel killed off its 1959 production goals. Last year's Corvair production totaled 79,164 cars. The division plans to build 70,000 compacts in January and February alone.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
November	254,518	514,152
December	494,937	593,920
Totals	5,593,674	4,244,045

Week Ended	1959	1958
Dec. 12	86,056	137,882
Dec. 19	152,449	135,964
Dec. 26	103,219	104,907
	1960	**1959**
Jan. 2	112,113	97,664
Jan. 9	161,907†	133,362
Jan. 16	165,000*	134,467

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Overseas Still Lucrative

With compacts off to a fast start, automakers are looking for expanded markets overseas. Ford's Venezuelan subsidiary reports it has purchased a 105 acre site near the municipality of Valencia so it can build an 80,000 sq ft supply depot and service school for Ford dealers in the country. Prefabricated structural steel and aluminum building products will be imported from the U. S. to construct the depot, which will be finished in July, says Royal F. Kelly, president, Ford Motor Co. (Venezuela), SA.

Chrysler Corp. continues to promote its affiliated import, Simca. Total sales of Simca imports last year were 35,000 compared with 16,472 sales in 1958. The 765 Simca dealers will concentrate on penetrating the $1700 to $2000 price class in an attempt to get 15 per cent of that market group that's virtually untouched by U. S. built economy cars. It should put Simca's 1960 import sales target around 40,000 units.

Vaughn Hayes, left, manager of production engineering at Twinsburg, discusses coil processing economies with Jack Rogers, Wean's director of sales and engineering.

Chrysler blanks strip steel by "trap" shearing on Wean coil processing line

Trapezoidal shearing from coil is, in many cases, the most economical way to prepare blanks for subsequent press operations. Two, independent, pivoting shear heads allow selection of the most economical proportions of the blanks for the finished shapes. This "tailoring" of the material to the end parts eliminates much of the material loss that would result if these same parts were stamped and drawn from square-cut sheets.

Wean has designed and built almost all of the "trap" shear lines used today. The installation shown is at Chrysler Corporation's mammoth Twinsburg stamping plant. This Wean coil processing line incorporates strip cleaning, flexing, leveling and shearing operations that turn as-received mill coil into sheet, ready for press work.

Wean's leadership in this field of coiled metals processing can help you realize production economies, too. We suggest that you explore the matter further with an experienced Wean sales engineer; or write for our new coil processing brochure now in preparation.

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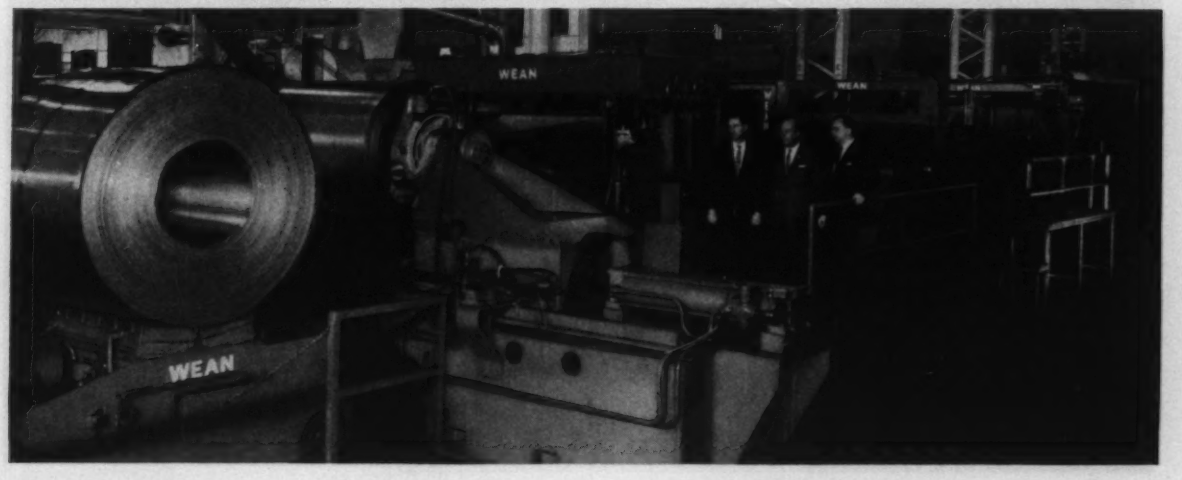
Wean trapezoidal shearing line at Chrysler's Twinsburg Stamping Division plant produces blanks for body stampings from coils weighing up to 30,000 pounds.



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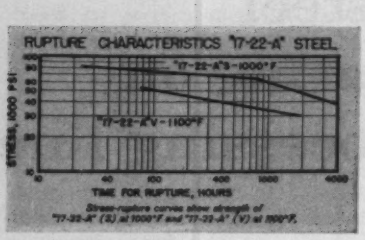

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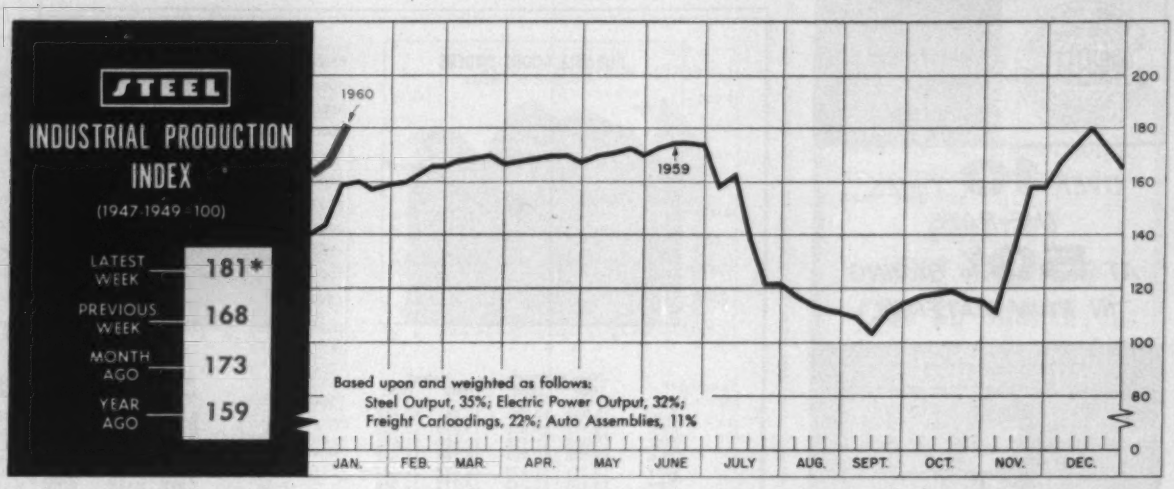
Timken Alloy Steel and Seamless Steel Tubing are available from warehouse stocks in 44 cities in the United States.



*Week ended Jan. 9.

Index Portends Record Breaking 1960

STEEL's industrial production trend line moved into new high ground before the leftovers of the New Year's turkey were gone.

Given a mighty shove by the resurging auto industry, the index jumped 13 points to a preliminary 181 (1947-49=100). If early estimates hold, the week ended Jan. 9 will top the previous high (set just before Christmas) by a scant point.

● **Big Difference**—All four components of the barometer recovered from the holidays to contribute to the peak performance. But it was auto production that made the difference between a record and a near miss. Motordom turned out more cars and trucks (191,596 units) in the Jan. 9 week than in any week since early December, 1956. Since only a handful of the factories were on six day schedules, it would not be surprising to see that total upped if demand warrants it.

Automakers are keeping their eyes on two sets of figures. Of first importance are retail sales reports, and there is some encouragement there. In the last ten days of December, the daily selling rate climbed to 16,467 units compared with 12,500 in the previous ten days, says *Ward's Automotive Reports*. It's difficult to attribute the rise to greater availability of models and colors because production was low most of the month. Inventories (the second set of figures) were close to 575,000 units on Jan. 1, well below the normal level for the turn of the year.

Replacing dealers' stocks will keep production at about the present level throughout the month. Even if sales climb to the area of 20,000 a day in January, inventories will still be only about 700,000 to 750,000 units, which is not at all out of line. The impact of the steel settlement on new car sales has yet to be measured. But if it comes up to expectations, you could see an all-time quarterly record of nearly

BAROMETERS OF BUSINESS

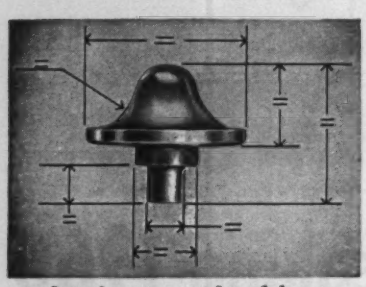
	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,721[1]	2,715	2,111
Electric Power Distributed (million kw-hr)	14,100[1]	13,425	13,554
Bituminous Coal Output (1,000 tons)	7,330[1]	6,850	7,015
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,068	6,955
Construction Volume (*ENR*—millions)	$231.4	$191.0	$273.7
Auto, Truck Output, U. S., Canada (*Ward's*)	200,339[1]	136,730	165,011
TRADE			
Freight Carloadings (1,000 Cars)	600[1]	483	550
Intercity Truck Tonnage (changes from year ago)	+6%	+7.5%	...
Business Failures (Dun & Bradstreet)	226	195	203
Currency in Circulation (millions)[3]	$32,519	$32,893	$32,008
Dept. Store Sales (changes from year ago)[3]	+9%	+20%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,370	$22,280	$23,426
Federal Gross Debt (billions)	$290.7	$291.1	$282.9
Bond Volume, NYSE (millions)	$32.8	$31.1	$38.0
Stocks Sales, NYSE (thousands of shares)	18,027	13,343	20,838
Loans and Investments (billions)[4]	$106.7	$106.5	$96.6
U. S. Govt. Obligations Held (billions)[4]	$27.5	$27.5	$31.9
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	233.6	232.2	217 3
All Commodities[7]	118.8[1]	118.8	119.3
Commodities Other than Farm & Foods[7]	128.5[1]	128.5	127.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,474; 1959, 2,831,486. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

Manufacturers of Cold Headed Fasteners Since 1888

OVER **10** TIMES THE RATE AT **50%** SAVING IN RAW MATERIAL



Another example of how Hubbell Cold Heading produces Better Parts at Faster Speeds, at Lower Cost

THE PART:
Click Button

THE MATERIAL:
Brass

THE METHOD:
Hubbell cold heading in place of screw machining.

THE RESULT:
This brass click button was machined previously from bar stock, involving several different operations that removed nearly 50% of the total weight of the original stock . . . a wasteful, time-consuming, costly process.

Hubbell now produces essentially the same part at tremendous savings in time and material cost.

a. Production is increased from the original rate of 5.5 pcs. p.m. to cold heading rate of 60 pcs. p.m.

b. Labor, overhead and material cost has been reduced 36%.

c. The finished part is stronger, more accurate, with greater uniformity.

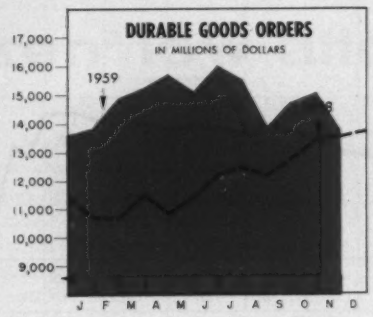
Hubbell Cold Heading may provide equally dramatic results for you. Whether it is presently cold headed or not, send blueprint of part or sample for analysis and estimate.

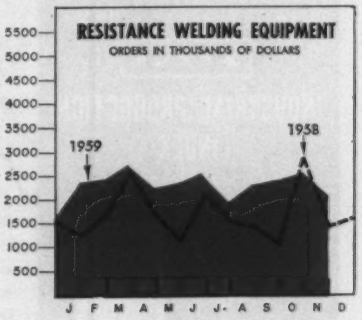
HARVEY HUBBELL, Inc. *Machine Screw Dept.*
Bridgeport 2, Connecticut

Kindly estimate on the enclosed sample (blueprint) Quantity _____

Name _____
Title _____
Company _____
Address _____

THE BUSINESS TREND





	New Orders* 1959	New Orders* 1958	Sales* 1959	Sales* 1958
Jan.	13,900	10,704	13,541	12,646
Feb.	14,918	10,688	13,870	12,033
Mar.	15,323	11,488	14,400	11,670
Apr.	15,796	10,833	15,166	11,532
May	15,241	11,423	15,515	11,643
June	16,133	12,245	15,771	12,086
July	15,493	12,512	15,384	12,256
Aug.	13,974	12,177	14,008	12,385
Sept.	14,747	12,859	14,113	12,723
Oct.	15,100†	13,530	13,949†	12,943
Nov.	13,900†	13,574	13,500†	13,295
Dec.	.....	13,673	.....	13,613

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

	Net Orders 1959	Net Orders 1958	Shipments 1959	Shipments 1958
Jan.	2,396	1,243	1,427	1,422
Feb.	2,457	1,683	1,889	1,615
Mar.	2,811	2,550	2,179	1,659
Apr.	2,258	1,684	2,193	1,963
May	2,407	1,121	2,019	1,750
June	2,597	2,113	2,702	2,346
July	1,980	1,534	2,269	2,342
Aug.	2,322	1,431	2,928	1,419
Sept.	2,435	1,060	2,113	1,125
Oct.	2,599	2,885	2,097	1,559
Nov.	2,131	1,409	1,597	1,102
Dec.	....	1,554	....	1,357
Totals	....	20,258	....	19,659

Resistance Welder Manufacturers' Assn.

Charts copyright, 1960, STEEL.

2,280,000 assemblies in the January-March period.

Combined with a first quarter schedule of 397,400 trucks (a record for the period), this could go a long way toward making the next few months the busiest many metalworkers have ever known.

• **Steel Holding Up**—The steel industry, which supplied the early pressure in the current uptrend, has leveled off at just below its record production rate. STEEL estimates output for the week ended yesterday (Jan. 17) at 2,721,248 net tons of ingots for steel and castings, with operations at 95.5 per cent of the 1960 capacity. There has been no sign of a slackening of demand since the signing of the new contract.

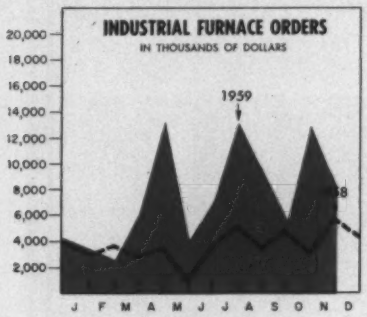
Three factors will keep the operating rate near the current figure for the foreseeable future: 1. Consumption is high. 2. Inventories still must be rebuilt to a level high enough to support the increased consumption. 3. Undoubtedly, some users will hedge against a price hike later this year.

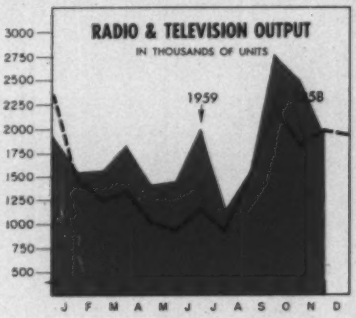
• **Neutral Factors** — Both electric power production and railroad freight carloadings could be neutral or slightly negative factors during this quarter. While industrial consumption of electric power will continue to gain, commercial and residential requirements are likely to be less than they were last year because of the outlook for a comparatively mild winter. The year-to-year gains have been running about 8 per cent.

If freight carloadings run true to form, they will show only minor changes from now until spring. They are running well ahead of the year-ago figures, thanks in part to piggyback loadings. The Association of American Railroads reports that during the week ended Jan. 2, such freight was up 48.5 per cent from the corresponding 1959 figure.

FRB Index Heads for Peak

The performance of STEEL's trend line indicates that the Federal Reserve Board's industrial production index also will start 1960 at a record level. While it was not available at presstime, the December figure was expected to nearly match the previous high of 162 (1947-49=100) registered by the board's revised index last May and June. The relative importance of both the steel industry (5.07 per cent of the old in-





	1959	1958	1957
Jan.	3.518	3.047	8.775
Feb.	2.741	3.684	9.769
Mar.	6.146	2.871	10.485
Apr.	13.328	3.572	4.559
May	4.174	954	5.389
June	7.029	3.672	4.369
July	13.141	5.169	4.332
Aug.	9.738	3.533	3.924
Sept.	5.560	4.846	7.463
Oct.	12.967	3.105	3.674
Nov.	8,442	5,597	2,832
Dec.	....	4,284	3,992

Industrial Heating Equipment Assn. Inc.

	Radio		Television	
	1959	1958	1959	1958
Jan.	1,125	1,026	437	434
Feb.	1,125	877	459	370
Mar.	1,348	931	494	417
Apr.	1,040	630	389	303
May	1,040	655	432	287
June	1,430	774	571	337
July	829	593	350	275
Aug.	1,009	981	547	507
Sept.	1,981	1,493	808	622
Oct.	1,796	1,322	707	496
Nov.	1,346	1,438	561	438
Dec.	....	1,526	...	415
Totals	....	12,246	...	4,921

Electronic Industries Association.

dex vs. 6.21 per cent of the new) and the auto industry (4.54 per cent vs. 5.04 per cent) will contribute to a record level of perhaps 163 to 165 in January.

Power to Double by '70

Electric power output by 1970 should be about 1,480 billion kw-hr, about double the record 707 billion turned out last year, declares Allen S. King, president of Edison Electric Institute.

By 1980, production should be close to 2,795 billion kw-hr, and in another ten years it could run between 6 trillion and 10 trillion kw-hr. This would continue the pattern of doubling every decade as it has done since 1940.

Building Off 1959 Pace

Construction contract awards started off 1960 better than they ended up 1959, but they are still significantly behind the year-ago level. *Engineering News-Record* reports awards in the holiday week ended Jan. 7 totaled $231.4 million, 15 per cent below the corresponding figure for last year. Although public awards topped private contracts, they still lagged the 1959 pace by 38 per cent. Private awards topped a year ago by 62 per cent.

Rising costs continue to plague the construction industry. *EN-R's* construction cost index started 1960 at a near record level of 811.98 (1913=100) and the building cost index stood at 554.34 (1913=100), a shade under the September record. Higher wages have the greatest impact on the rise in costs.

Trends Fore and Aft

- Retail sales of home appliances will increase $275 million this year, says Judson S. Sayre, president of Norge Div. of Borg-Warner Corp. Sales of the major products will increase from 15 million units last year to 16 million this year (see Page 61).
- The November new order index of the Foundry Equipment Manufacturers Association dipped to 131.2 from October's 140.8 (1947-49=100).
- Department store sales for all of 1959 were 7 per cent above the 1958 total.
- Despite the steel strike, output of bituminous coal in 1959 almost matched 1958's, says the National Coal Association. Totals: 410 million tons vs. 410.4 million.

MARIAN A. STACHOWIAK,
Hayes Induction Heating Engineer, reports . . .

SELECTIVE HEAT TREATING CAN BE SIMPLE . . .

when equipment and application know-how go to work

High-Frequency Induction Heating . . . standard procedure for selective hardening, melting, annealing, brazing, preheating, hot forming, sintering, and vacuum heating . . . now takes a big step forward with another Hayes development — a new high-frequency induction unit that puts selective heating on a *simple* and *economical* basis.

PUSH-BUTTON Controls are featured with this new Hayes induction heater to obtain instant and exact heat distribution at any desired surface area of a steel part. Heating and quenching cycles are *automatically controlled* and are so rapid that distortion, decarburization, and excessive oxidation are practically eliminated. Protective atmosphere systems (pioneered by Hayes) can be supplied as an integral part of the induction unit.

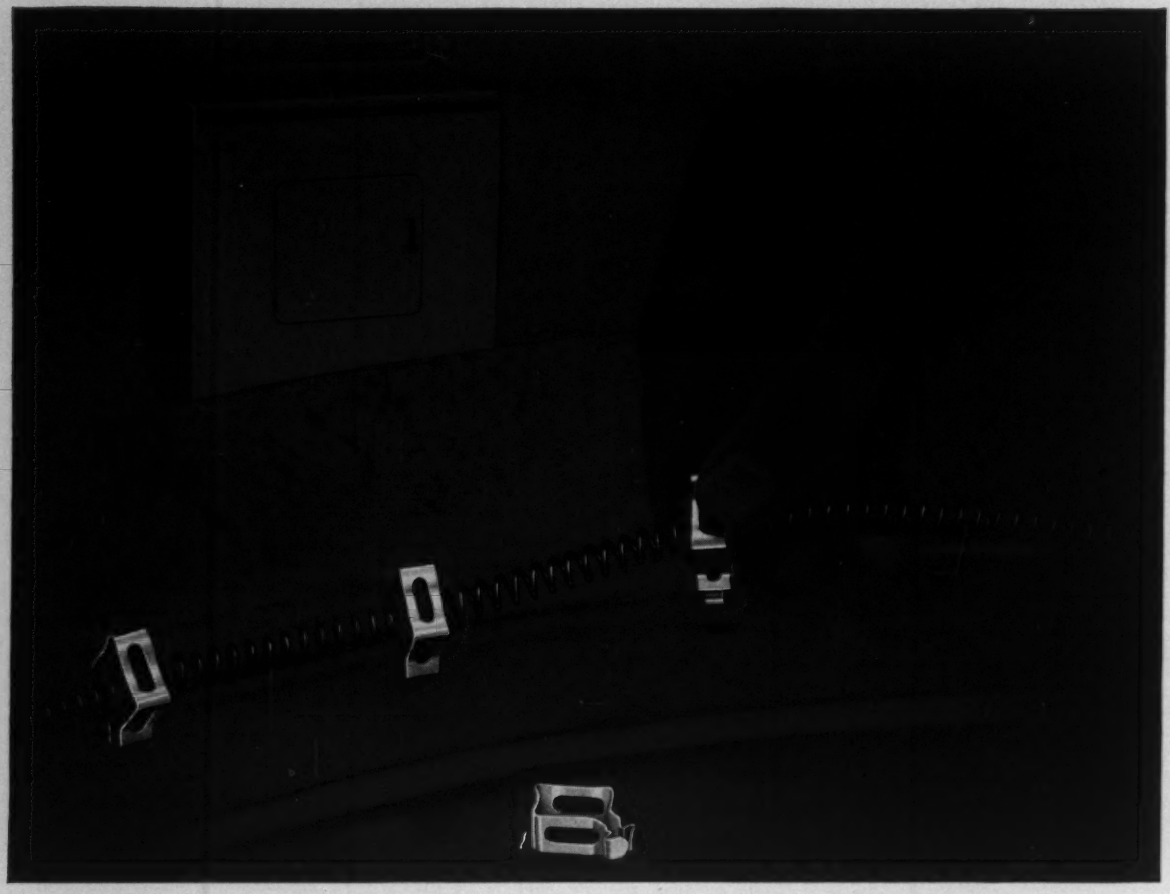
UNIT Design Saves Space — because heater stations and power generator are incorporated in *one* compact cubicle . . . for more output per sq. ft. of floor space. Moreover, the Hayes unit includes work handling devices which can be set up simply, integrated into your production line, and operated as easily as any other machine tool.

Safe, Easy Maintenance is another feature of Hayes' design. Easy-access panels provide plenty of working room for maintenance and adjustment of components. Safety interlock switches throughout shut off plate power when panels are opened. Write for information on Hayes new induction heating unit, work tables and accessories . . . or other "Results Guaranteed" furnaces in Hayes Certain Curtain line.

FREE BULLETIN 5910

C. I. HAYES, INC.
839 Wellington Avenue • Cranston 10, R. I.
Established 1905

It Pays To See Hayes for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and liquid dryers.



Engineered by Tinnerman...

SPEED CLIPS® reduce costs, simplify assembly and servicing on Maytag "Halo of Heat" Dryer

Clothes are dried efficiently in the famous Maytag "Halo of Heat" automatic dryer. And now the quality of the "Halo of Heat" dryer is even better than ever because its unique circular heating element is fastened quickly, securely by 22 special Tinnerman SPEED CLIPS developed by joint efforts of Tinnerman and Maytag designers.

Each one-piece SPEED CLIP eliminates a separate welding operation on the "Halo of Heat" assembly. Various screw-driving operations formerly required on Maytag's assembly line to capture the ceramic insulator and secure the mounting clamp were also eliminated, with equally interesting reductions in cost. Now, the stainless steel, vibration-proof fastener is snapped in place with simple "button-hook" action. No special skills or equipment are required. Assembly and parts costs have been reduced... *substantially!* Serviceability in the field has been improved.

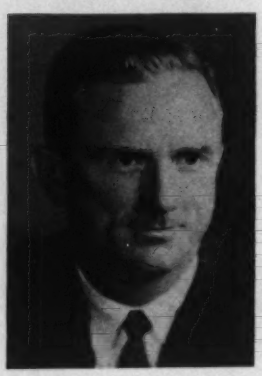
A free Tinnerman Fastening Analysis of your own product can show you where similar assembly and cost-saving advantages are possible. Call your Tinnerman representative—he's listed in the Yellow Pages under "Fasteners". Or write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.



J. WALLACE NALL
Lamson & Sessions v. p.

WILLIAM L. PRINGLE
a Chrysler div. president

HOWARD C. MYERS JR.
Midvale-Heppenstall post

PHILLIPS W. SMITH
Jack & Heintz president

J. Wallace Nall was elected a vice president of **Lamson & Sessions Co.**, Cleveland. He continues as general manager of the company's Chicago plant.

William L. Pringle was appointed president of **Chrysler Corp.'s** Marine & Industrial Engine Div., Detroit. He succeeds **A. S. Hudson**, resigned. Mr. Pringle recently resigned as president of Hercules Motors Corp.

Robert F. Stewart joined **Gabriel Electronics Div.**, Gabriel Co., as product manager, Commercial Microwave, Millis, Mass. He was with Microwave Associates and General Communication Co.

Blaz A. Lucas Jr. was elected vice president-sales, **Ingersoll Products Div.**, Chicago, Borg-Warner Corp. He was sales manager.

Jan M. Garvin was made director of marketing, **USI Robodyne**, Silver Spring, Md., a division of U. S. Industries Inc.

Erling Ringstad, manager of **Copperweld Steel International**, export sales agency of Copperweld Steel Co., Pittsburgh, was appointed executive vice president.

Frank E. Kyndberg, sales manager, American Steel & Wire Div.'s **Cyclone Fence Dept.** at Waukegan, Ill., transfers to the Cleveland headquarters of the U. S. Steel Corp. division. He continues to supervise the department's sales, working directly with the wire division's general manager of sales solicitation.

Howard C. Myers Jr. was made director of metallurgy, **Midvale-Heppenstall Co.**, Philadelphia. Associated with the firm for almost 30 years, he was general superintendent-testing and inspection.

Larned S. Whitney Jr. was elected president, **Stanley-Humason Inc.**, Forestville, Conn., subsidiary of Stanley Works. He was vice president-general manager.

Louis S. Oosten was named vice president-engineering, **Bell & Gossett Co.**, Morton Grove, Ill. He succeeds the late **Harold A. Lockhart.**

John C. Lobb was elected vice president-long range planning, **A. O. Smith Corp.**, Milwaukee, a new post. He resigned recently as vice chairman and executive vice president of Marine Corp.

Harry L. Whitmer was made manager, Spring & Bumper Plant, Livonia, Mich., **Chevrolet Motor Div.**, General Motors Corp. He succeeds **Robert B. Dow**, promoted to manager of Chevrolet's Productive Equipment Dept., Detroit. **Arthur R. Cole** was made manager, Axle Plant, Buffalo, to succeed **Ralph L. Petersen**, retired.

Ralph I. Condon was made purchasing manager, **Twin Coach Co.**, in Cheektowaga, N. Y.

Carborundum Metals Co., Niagara Falls, N. Y., appointed **Lyle B. Hoskins** manager of manufacturing for both the Akron, N. Y., and Parkersburg, W. Va., plants.

Phillips W. Smith was elected president, **Jack & Heintz Inc.**, Cleveland, to succeed the late **Frank R. Kohnstamm.** Mr. Smith served in various Army and Air Force capacities until retirement four years ago as a major general. His last assignment was comptroller of the Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio.

Ralph M. La Porte succeeds **W. A. Romain**, resigned, as president of **Sherman Products Inc.**, Royal Oak, Mich. **Vincent J. Crampton** was elected executive vice president, retaining the offices of secretary and treasurer.

John E. Kenney was elected president and chief executive officer of **Foster Wheeler Corp.**, New York. He succeeds **W. L. Martwick**, elected chairman to succeed **Adm. Earl W. Mills**, retired.

Dr. Leland G. Cole was made vice president-research for **Beckman Instruments Inc.**, Fullerton, Calif. He formerly was chief research chemist for Consolidated Electrodynamics Corp.

American Rivet Co. Inc., Chicago, appointed **Richard G. Buck** a vice president, responsible for sales in several eastern and midwestern states, with headquarters at the Logansport, Ind., office.

Charles J. Chapman was made vice president-marketing, **National Carbon Co.**, New York, a division of Union Carbide Corp.

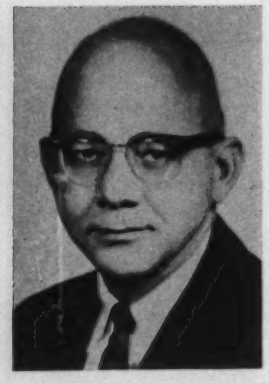
Paul Duke was elected vice presi-

HENRY J. WALLACE

EDMUND G. PRICE

National Tube president and executive v. p.

ROBERT P. FOX



E. W. TAYLOR

join engineering staff of American Hoist

dent, **L. B. Foster Co.**, Pittsburgh. He managed the regional office in Atlanta.

Henry J. Wallace succeeds **John E. Goble**, retiring president of **National Tube Div.**, United States Steel Corp., Lorain, Ohio, effective Feb. 1. **Edmund G. Price** will succeed **William F. McConnor** who retires as executive vice president. Mr. Wallace was vice president-sales. Mr. Price was vice president-operations.

W. P. Armstrong was appointed general sales manager, **Pacific Tube Co.**, Los Angeles. **A. C. Geldner Jr.** was made manager-bar sales; **H. R. Shuptrine**, assistant plant superintendent; **C. A. Taylor**, office manager.

Frederick M. Jackson was appointed sales manager, R-P&C Valve Div., **American Chain & Cable Co. Inc.**, Reading, Pa. He was vice president-sales, Walworth Co. **John S. Buckley** was made sales manager, Pennsylvania Power Mower Div., Exeter, Pa. He succeeds **A. M. Tinker**, retired.

Robert P. Fox and **E. W. Taylor** joined **American Hoist & Derrick Co.**, St. Paul. Mr. Fox will be in charge of engineering concerning revolver cranes, hoists, derricks, and related products. Mr. Taylor will be manager, Engineered Projects Div. Mr. Fox was chief engineer, Clyde Iron Works, Duluth. Mr. Taylor was vice president and chief engineer, Industrial Brownhoist Corp., Bay City, Mich.

Jack Sage fills the new post of manager of service for **Wyckoff Steel Co.**, with headquarters at general offices, Pittsburgh. He was in charge of inventory control at the firm's Ambridge, Pa., Works.

C. H. Glasier was appointed executive vice president of **Air Reduction Sales Co.**, a division of Air Reduction Co. Inc., New York. He was vice president-gases.

Eugene B. Price was named manager of materiel of **Kinetics Corp.**, Solana Beach, Calif. He was with Convair Astronautics where he served in senior buyer and contract administration capacities connected with production of the Atlas missile.

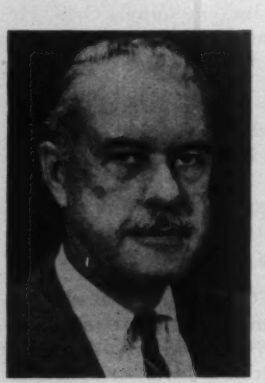
Thompson Pipe & Steel Co., Denver, appointed **S. Mark Davidson** first vice president; **Joseph L. Brown** vice president-product development; **Robert E. Gilmor** chief engineer.

Emerson S. Reichard Jr. was made vice president-administration, **Aerojet-General Corp.**, Azusa, Calif., subsidiary of General Tire & Rubber Co. **Elmer E. Nelson** was made assistant to the president.

R. E. Burns was named Chicago district sales manager, **Aluminum Co. of America**. He succeeds **T. C. Jones**, recently elected president of Nalco Chemical Co., partly owned subsidiary of the Alcoa Foundation.

Ernest N. Robinson was appointed general manager, **Alemite & Instrument Div.**, Chicago, Stewart-Warner Corp. He succeeds **W. A. Brown Jr.** Mr. Robinson was director of marketing for the division.

James G. Orehosky was appointed



FREDERICK M. JACKSON

R-P&C Valve sales mgr.

C. H. GLASIER

Air Reduction Sales exec.

EUGENE B. PRICE

Kinetics mgr.-materiel

ERNEST N. ROBINSON

Stewart-Warner div. gen. mgr.

A new money-saver from Whiting's Custom Crane Department, this special rotating crane was developed for a Chicago publishing firm. Dock-anchored at one end, it swings out over the Chicago River to unload paper-laden barges. Unusual remote operator's cab also swings out to give full view of action. High unloading speed saves valuable time, cuts man hours. Full view from cab avoids damage to paper rolls, assures complete safety. All this from Whiting, where 75 years of crane experience add up to a wealth of working knowhow. Call Whiting whatever your needs in custom or standard cranes.

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CRANES

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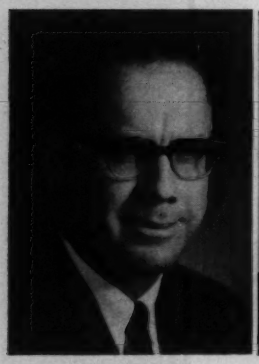
MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT



JOHN P. DeHETRE
Youngstown Sheet sales

ROBERT W. MILITZER
Micromatic Hone chief eng.

JAMES H. WYRES
heads Porter div. sales

R. KENNETH SMITH JR.
Alcoa research div. mgr.

G. E. NEVILL
Cameron Iron Wks. post

EDWARD P. FLEISCHER
Electro Mech. Instrument post

director of purchasing, **Narda Microwave Corp.**, Mineola, N. Y.

R. Kenneth Smith Jr. was named manager of **Aluminum Co. of America's** Commercial Research Div., Pittsburgh, to succeed **E. M. Strauss Jr.**, recently named assistant district sales manager in Philadelphia. **George V. B. Day** was named assistant manager for the division.

Carl H. Gross fills the new post of marketing manager, **Fischer Special Mfg. Co.**, Cincinnati. He is succeeded as sales manager by **Robert L. Payne.**

Pall Corp., Glen Cove, N. Y., appointed **Charles H. Hacker** chief engineer-industrial filters; **Martin Kurz** manager of porous metals; **Stanley Sakol** assistant sales manager; **Morris Sankey** director of quality control.

Robert H. Garretson was made group vice president, Data Processing Divisions, **Consolidated Electrodynamics Corp.**, Pasadena, Calif., a newly created post.

G. E. Nevill was appointed engineer of standards in the Product Engineering Dept., **Cameron Iron Works Inc.**, Houston.

Edward P. Fleisher, former assistant to the president, was made an assistant director of **Electro Mechanical Instrument Div.**, Consolidated Electrodynamics Corp., Pasadena, Calif. In the newly created post, he is responsible for manufacturing.

John F. Claydon, general manager, Coated Abrasives Div., was elected a vice president of **Carborundum Co.**, Niagara Falls, N. Y.

F. M. Thimmesh was elected president, **Rosco Mfg. Co.**, Minneapolis, to succeed **J. A. Miller Sr.**, now chairman. **George W. Fulford** was elected executive vice president, continuing as sales manager. **J. D. Aldrich** was elected vice president.

Virgil A. Romito was made director of production, General Chemical Div., **Allied Chemical Corp.**, New York.

John P. DeHetre succeeds **John M. Tuthill**, retired, as general sales manager, **Youngstown Sheet & Tube Co.**, Youngstown. Mr. DeHetre was assistant general manager of sales.

Robert W. Militzer was appointed chief engineer, **Micromatic Hone Corp.**, Detroit. He was supervisor of mechanical engineering.

H. K. Porter Company Inc. consolidated sales forces for its Forge & Fittings Div., Roselle, N. J., and named **James H. Wyres** general sales manager of the division. He heads sales activities of W-S Fittings Works and Cleveland Works. Named to newly created posts to assist him are: **James E. Ocello** as manager-distributor sales; **T. Bruce Cox**, manager-product sales; **E. H. Kyle**, manager-industrial and truck hardware sales; and **W. H. Dresing**, manager-commercial forging sales.

Adolph R. Schaub was named manufacturing manager, **L. J. Wing Mfg. Co.**, Linden, N. J., a division of Aero Supply Mfg. Co. Inc. He was production manager and shop superintendent for M. W. Kellogg Co.

OBITUARIES...

Clarence E. Pullum, 66, executive vice president, **Bell & Gossett Co.**, Morton Grove, Ill., died Jan. 8.

Austin C. Ross, 66, former vice president, **Worthington Corp.**, died in Buffalo Jan. 8.

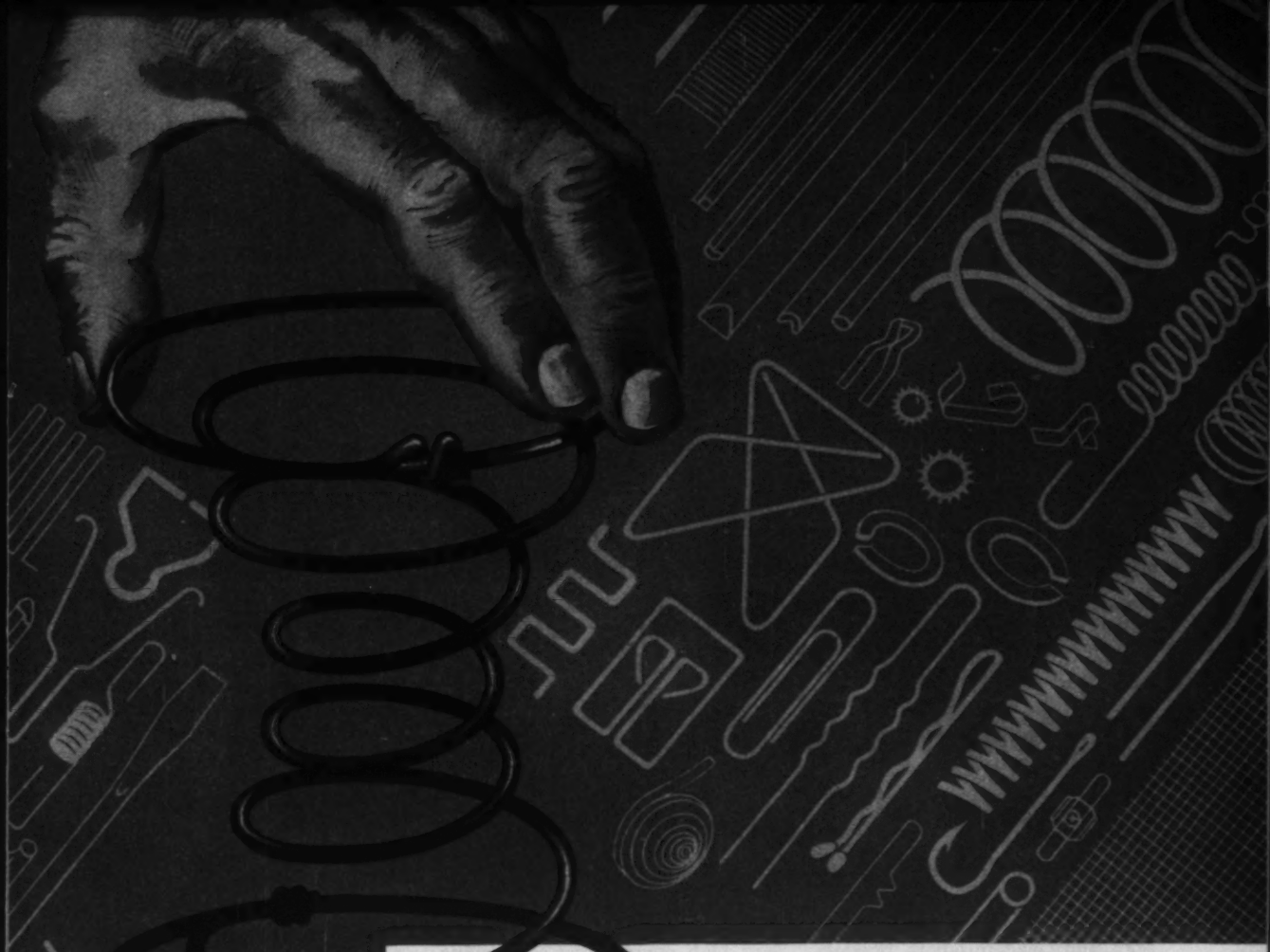
John Verson, 64, senior vice president, **Verson Allsteel Press Co.**, Chicago, died Jan. 8.

W. P. Witherow, 71, former president and chairman of **Blaw-Knox Co.**, Pittsburgh, died Jan. 7.

Joseph E. Kewley, 76, a former vice president of **General Electric Co.** and general manager of the Lamp Div. at Nela Park, Cleveland, died Jan. 4.

F. S. VanValkenburg, 72, retired chairman, **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn., died Jan. 2.

John C. Pangborn, 75, co-founder of **Pangborn Corp.**, Hagerstown, Md., died Dec. 24.



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PAGE *-the source for answers to wire problems*

This reversing hot rolling mill produces copper and copper alloy sheets to a maximum width of 60 in. at Anaconda-American Brass Ltd.'s plant at New Toronto, Ont. Operation marks completion of a multimillion dollar expansion project

Anaconda Expands Rolling Capacity of Toronto Plant

A MULTIMILLION dollar expansion and modernization program has been completed at the New Toronto, Ont., plant of Anaconda-American Brass Ltd. New equipment includes a reversing hot rolling mill and a four high cold rolling mill.

• **Hot Mill**—Total cost of the hot mill was about $2 million, including nearly $500,000 for electrical equipment. Supplementary equipment includes a gas fired, walking beam type furnace, conveyors, run-out tables, a shear, pickling line for cleaning copper, and a coiler. Mechanical handling equipment permits the entire operation to be handled by a crew of three.

The mill can roll heated copper and copper alloy cakes weighing up to 2½ tons each, 8 in. thick. Sheets can be rolled to a maximum width of 60 in.

The machine reverses on rolls in opposite directions, greatly increasing speed of the rolling operation. A 6 in. thick copper cake, for instance, can be reduced to a gage of 0.200 in. in just 2 minutes.

• **Cold Mill** — Installation of the four high nonreversing cold rolling mill steps up sheet metal production to a new high. This project cost about $1 million, including some $300,000 worth of electrical equipment.

The mill can roll 5000 lb coils of copper and copper alloys up to 40 in. wide. Motor driven pay-off and wind-up blocks control the position and tension of the metal as it passes through the work rolls. Metal can leave the high speed rolls at a rate up to 750 fpm.

Conveyors and automatic handling equipment permit operation by a crew of only two men. Auxiliary equipment includes a finishing line composed of a pay-off trim shear, a leveler, and a cut to length shear. Final steps in the operation are inspection and packing.

The equipment improves quality of the product by giving the metal a better surface and grain structure than before, as well as producing flatter and straighter sheets, company officials say.

Establish Foreign Outlets

Many metalworking firms are broadening their foreign contacts. Some examples and methods:

• Gibson Carbide Inc. has been organized as a subsidiary of Gibson Electric Co., Delmont, Pa., to erect a plant in Luquillo, Puerto Rico, for the manufacture of electrical contacts and contact assemblies. H. C. Graves III is vice president and general manager of the new plant.

• Heil Co., Milwaukee, has granted a license to Teisa-Cherry-Burell SA, Mexico City, Mexico, for the manufacture of over the road truck tanks. The Mexican firm is a new subsidiary of Cherry-Burell Corp., Cedar Rapids, Iowa.

• Rockwell Mfg. Co., Pittsburgh, has established Rockwell International SA as a wholly owned sales subsidiary with offices in Geneva, Switzerland. The firm will be responsible for co-ordinating all of Rockwell's foreign business, other than Canadian and Mexican. Eric Newman is vice president and general manager of the new organization.

• Vibra Screw Feeders Inc., Clifton, N. J., has licensed Simon Handling Engineers Ltd., Cheshire, England, and Sulphates Ltd., Victoria, Australia, to produce and market the company's dry materials handling equipment.

• Continental - Diamond Fibre Corp., a subsidiary of Budd Co., Philadelphia, has appointed Rene A. Amrein as its representative in Europe with headquarters in Munich, Germany. He was a member of Budd's International Div., handling CDF's export sales.

• Rubber & Asbestos Corp., Bloomfield, N. J., has signed an exclusive licensing agreement with Adhesives Resistol SA, Calzada Atzcapotzalco, Mexico 15, D. F., for the manufacture and distribution of a diversified group of the firm's industrial adhesives.

• Koppers Engineering & Construction Div., Koppers Co. Inc., Pittsburgh, has contracted to supply technical and management assistance to two South American firms: Acerias Paz del Rio SA (an inte-

grated steel company with offices at Bogota, Colombia, and a plant at Belencito, Colombia) and Cia. Salitrera de Tarapaca y Antofagasta (an industrial firm headquartered in Santiago, Chile, with a nitrate mine and plant in northern Chile).

New Names Adopted

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has changed its name to Birdsboro Corp. The company manufactures steel mill machinery and hydraulic presses; primary jaw crushers; railroad specialties; stainless, alloy, and carbon steel castings; and porcelain enameled steel panels for walls.

Acme Stamping & Mfg. Co., Pittsburgh, has changed its name to Acme Stamping & Wire Forming Co. to denote the firm's expanding operations in the metalworking field.

W & M Products Corp., Warren, Mich., changed its name to Tuff-Kote Asphalt Products Inc.

Wyatt Industries Inc. is the new corporate name of Wyatt Metal & Boiler Works Inc., Houston.

Waterman Hydraulics Corp. is the new name for the former Waterman Engineering Co., 725 Custer Ave., Evanston, Ill. The company makes flow regulators, filters, and valves.

Raytheon Co., Waltham, Mass., changed the name of its Industrial Tube Div. to Industrial Components Div. to reflect an expansion of its product lines. The expansion will be achieved by building a line of nonmicrowave electronic components and by broadening the scope of the tube lines. Robert L. McCormack is division manager.

Raytheon is also consolidating its government and industrial electronic equipment service and support functions into one company-wide Electronic Services Div. O. L. Dewey is manager of the division.

Budd Realigns Divisions

Budd Co., Philadelphia, has merged its Tatnall Measuring Systems Div. and Nuclear Systems Div. into a single entity, Instruments Div. Dr. John H. Buck is vice president and general manager of the new organization at Phoenixville, Pa.

Budd has changed the name of its Defense Div. to SpaceAtomics Div., headed by J. B. Darrah, vice president and general manager. Budd's aircraft and missile ground handling equipment sales, contract administration, and engineering responsibilities have been transferred from the Railway Div. to the SpaceAtomics Div.

ASSOCIATIONS

Jean Vuillequez, American Metal Climax Inc., New York, has been elected president, chairman of the board, and chairman of the executive committee of **Lead Industries Association**, New York.

Roger E. Waindle, WaiMet Alloys Co., Dearborn, Mich., has been named by the **Investment Casting Institute**, Chicago, to the newly created position of vice president-Technical Div.

Industrial Truck Association, Pittsburgh, elected these officers: President, Philip S. Hill, Hyster Co., Portland, Oreg.; and vice president, R. L. Wolter, Automatic Transportation Co., Chicago. L. West Shea, Hanson & Shea Inc., Pittsburgh, was renamed executive secretary-treasurer.

Association of Lift Truck & Portable Elevator Manufacturers reelected these officers: President, P. D. Germond, Revolvator Co., North Bergen, N. J.; and vice president, K. E. Forster, Barrett-Cravens Co., Northbrook, Ill.

Society of Automotive Engineers Inc., New York, elected H. E. Chesebrough, Chrysler Corp., Detroit, president.

CONSOLIDATIONS

Pacific Iron & Steel Corp., Los Angeles, has been merged into **Standard Railway Equipment Mfg. Co.**, Chicago, producer of freight car roofs and ends and outboard motor boats. Pacific Iron is a fabricator and erector of structural steel and a producer of airline terminal equipment. Standard will operate its new property as a subsidiary under the name of PI Steel Corp.

Leeds & Northrup Co., Philadelphia, is negotiating for the purchase of **Thomas S. Gassner Co. Inc.**, that city, manufacturer of custommade sheet metal products. The Gassner firm will continue to operate as an independent unit under the presidency of C. J. McKee.

Arwood Precision Casting Corp., New York, merged with **Mercast Mfg. Corp.** and **Alloy Precision Casting Co.**, Cleveland, to form a new company, Arwood Corp. Officers are: Chairman, R. L. Wood; president, W. I. Matthes; and executive vice president, W. O. Sweeny. Arwood Corp. will operate foundries in Tilton, N. H.; Groton, Conn.; Brooklyn, N. Y.; and Los Angeles for conventional investment and shell castings. A foundry in LaVerne, Calif., will produce frozen mercury and shell castings. The firm will operate a large central tool shop and research laboratory in Brooklyn.

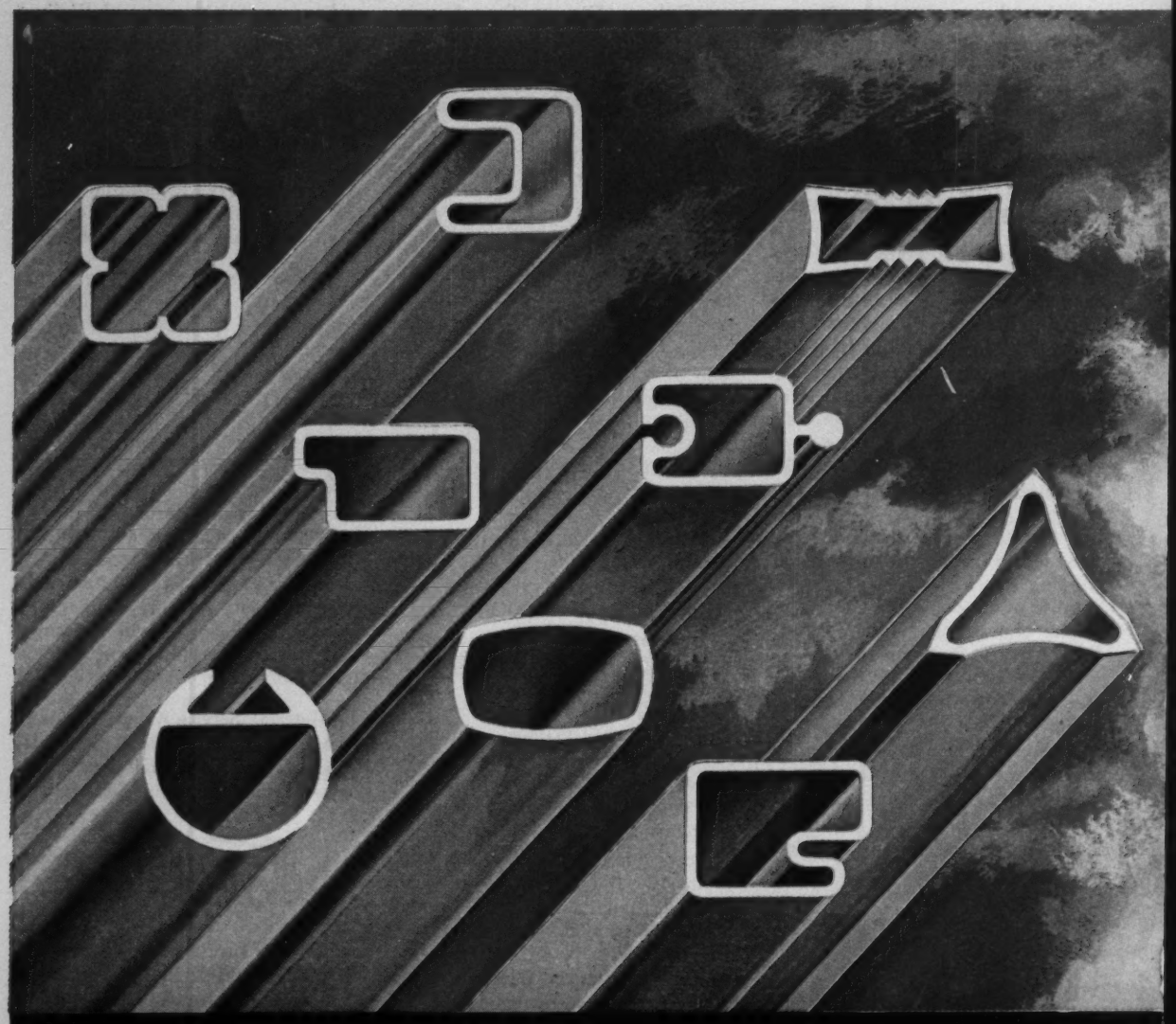
Material Service Corp., Chicago, has merged with **General Dynamics Corp.**, New York, and will be operated as the Material Service Div.

NEW OFFICES

Panellit Inc., Skokie, Ill., opened a regional office in the Prudential Bldg., Houston 25, Tex. J. E. Klueger is sales manager and G. H. Nolte is chief engineer for the Southwest region.

Beryllium Corp., Reading, Pa., opened a regional sales office at 401 N. Brand Blvd., Glendale 4, Calif. Ward Baxter Jr. is sales-development engineer in charge of the office. E. Jordan Brookes Co., 6601 Telegraph Rd., Los Angeles 22, Calif., will continue to warehouse beryllium copper foundry and mill products in California.

Miniature Precision Bearings Inc., Keene, N. H., opened a technical center and sales office at 8621 S. Bellanca Ave., Los Angeles 45, Calif. H. E. Gabriel has been appointed western manager of MPB. Robert R. Pierson will be in charge of the laboratory.



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Inlaid (decorative or rubbing) strip

Interlocking features

Modular design concepts

Stitchless (garden chair) covering

Smooth (roll-slide) animation

No longer need you use costly, difficult-to-extrude alloys when you want distinctive styling. New ALCAN TUBE-ALLOY gives you the design freedom of structural alloys . . . yet costs no more than alloys that need drawing for required strength.

From Aluminium Limited research—

The first aluminum alloy ever developed expressly for furniture applications

New ALCAN TUBE-ALLOY lets you design tubing to any extrudable shape and design . . . eliminates the drawing process and its design limitations

No longer need furniture designs (either functional or decorative) be limited by the drawing process!

For, unlike alloys commonly used for furniture tubing, new ALCAN TUBE-ALLOY needs no drawing to develop required strength. In fact, heat treating alone gives it substantially greater strength than AA-6063 (ALCAN 50S). This means that with ALCAN TUBE-ALLOY you're limited only by extruding—a process that makes possible tubing of most any cross-sectional shape and design.

New ALCAN TUBE-ALLOY also forms readily, gracefully . . . without the problem of "orange peel." Normal polishing and buffing give it a superior finish. And—as for cost—it is priced well below higher strength alloys heretofore necessary when distinctive styling or structural design was required. ALCAN TUBE-ALLOY's cost is competitive with low-strength furniture tubing alloys now in common use.

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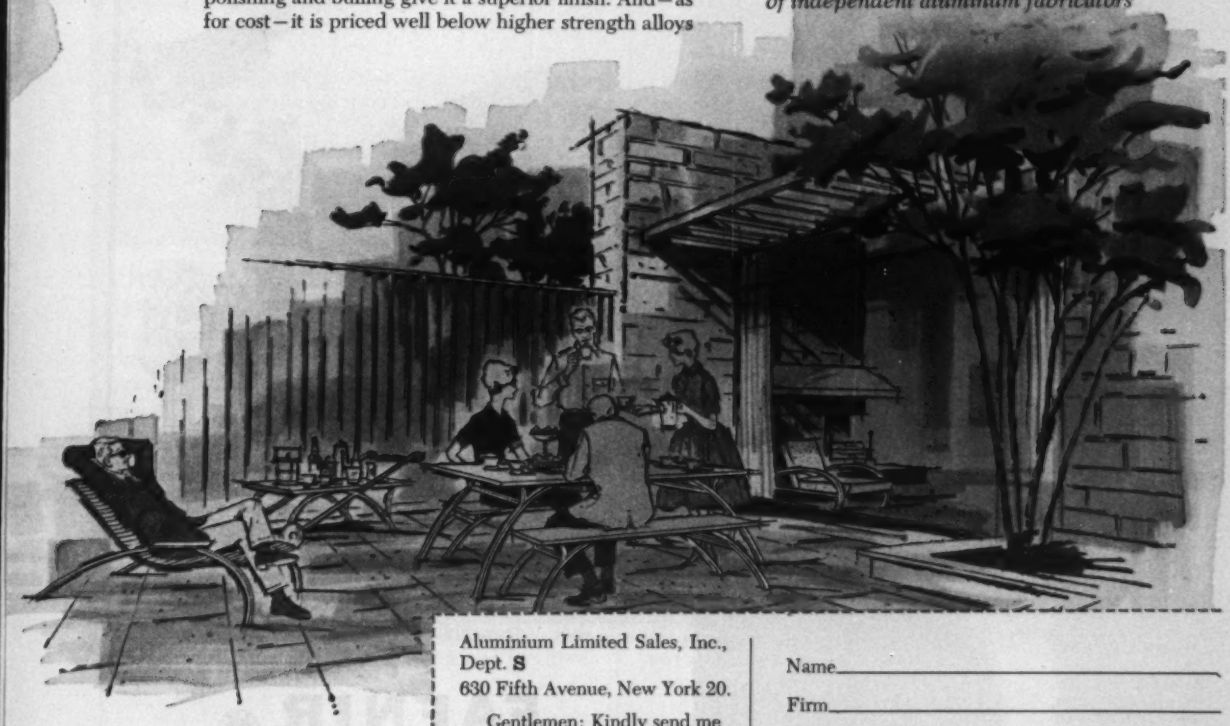

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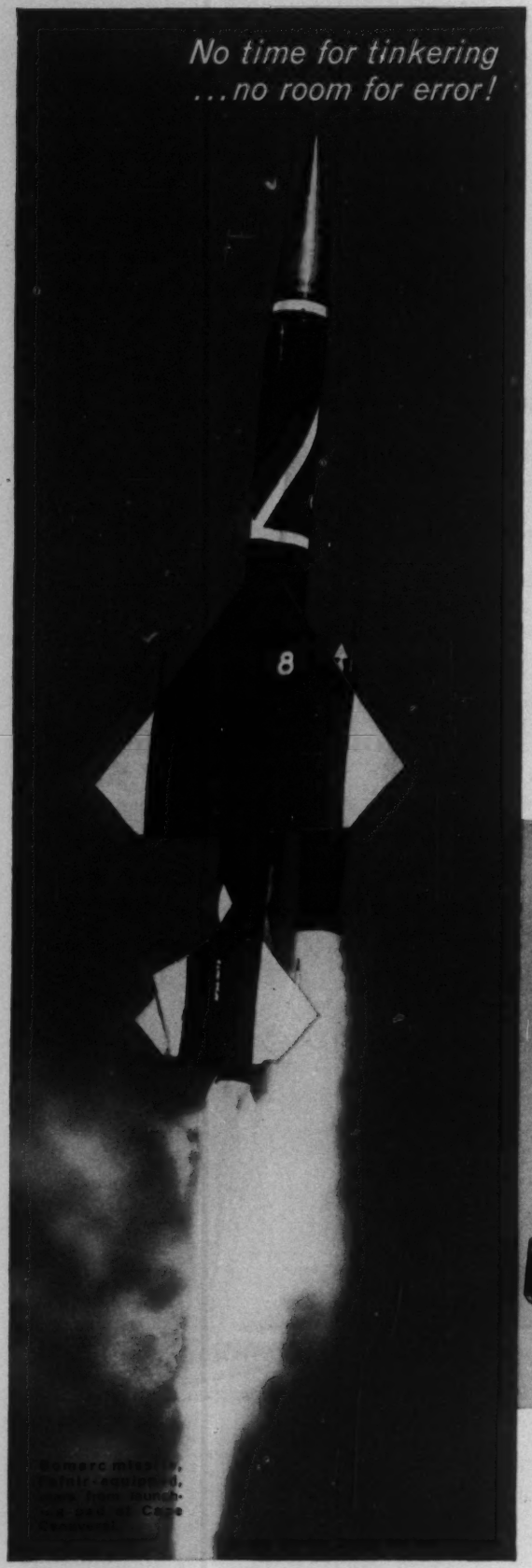


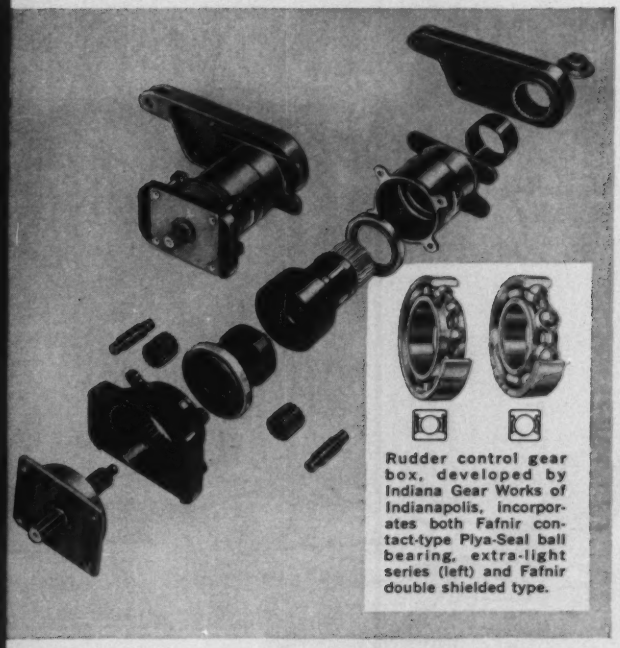
Fafnir Ball Bearings help keep Bomarc missiles "on tap"... and on target!

Used in the outboard rudder control gear box of the Boeing Bomarc, Fafnir ball bearings meet several important design requirements for Indiana Gear Works, designers of this vital missile component.

Fafnir prelubricated and shielded ball bearings, and bearings with Plya-Seals, for example, provide positive, built-in protection against contaminants. These bearings remain trouble-free, require no servicing, help keep the Bomarc ready to go at moment's notice.

Uniform high quality is another must. Fafnir quality control insures bearings that consistently meet exacting tolerance and dimensional requirements, installation after installation.

Your own design problem may not involve missilery. But if it calls for ball bearings, look to Fafnir. You'll find the diversity of line and breadth of experience that assure precise answers. Write The Fafnir Bearing Company, New Britain, Connecticut.



Rudder control gear box, developed by Indiana Gear Works of Indianapolis, incorporates both Fafnir contact-type Plya-Seal ball bearing, extra-light series (left) and Fafnir double shielded type.

FAFNIR BALL BEARINGS

Technical Outlook

SUBSTITUTES FOR STAINLESS—A series of iron base alloys containing aluminum, manganese, and carbon have oxidation and mechanical properties similar to those of stainless steels, say researchers at Ford Motor Co., Dearborn, Mich. Most promising alloy contains 8 per cent Al; 30 per cent Mn; 1 per cent C; 1.5 per cent Si.

PUSHING STEEL USES—A new process is said to permit the canning of milk with its original flavor. U. S. Steel Corp. sponsored the project at the University of Wisconsin. Expected price: 17 to 19 cents a quart.

COKE SAVER TRIED—Undaunted by previous unsuccessful tests, Lone Star Steel Co., Dallas, has been trying out natural gas as a supplement to coke in a blast furnace. Early results are said to be "good." If its method proves successful, Lone Star says blast furnace efficiency and flexibility will be improved.

HELIWELD JOINS B-70—Both resistance and Heliweld spots will be used on the B-70 bomber, states North American Aviation Inc., Los Angeles. The firm has improved the Heliweld process by incorporating more sensitive controls and a miniature feed to add filler wire to the nuggets.

CHEM-MILLED STEEL—A missile program in danger of being delayed by a shortage of certain size sheets was kept on schedule by having sheets chemically milled to size. Chemical Contour Corp., Gardena, Calif., says it dissolved 2½ tons from enough sheets to bring stock down to sizes which could be used. The firm claims it's the first time the method has been used on steel.

STUDY COLD CRUCIBLE—To improve the efficiency of vacuum melting, a segmented copper crucible has been developed. Researchers melted 11 cu in. of titanium in less than 2 minutes on an induction input of around 80 kilowatts. Advantages suggested by Battelle Memorial Institute, Columbus, Ohio: 1. No electrode preparation is needed. 2. The method can be adapted to continuous casting. Commercial feasibility hasn't been determined.

LIFETIME BEARING—A self-wicking lubricant eliminates the conventional oil hole and provides lifetime service for sleeve bearings, reports Permawick Co., Detroit. Reservoirs can be smaller than conventional types. The formula is also said to resist moisture and cold.

TIN-NICKEL PLATE GAINS—Tin-nickel plating has been making headway as a quality finish, claims Tin Research Institute, Columbus, Ohio. Some present uses: Drawing instruments, watches, coffeepots, refrigeration equipment. Covering power is said to be exceptional and it is easy to hit deep recesses.

BIGGER MOLYBDENUM STRUCTURES—Sandwich structures of molybdenum are getting big enough for Dyna-Soar space vehicles, says Finn Aeronautical Div., Astrometals Corp., Hawthorne, N. J. It has perfected a method of welding which overcomes previous size limitations. The technique is said to yield weldments with good ductility and strength with no cracking.

BIG HYDROGEN MAKER—A plant being built for an eastern mill will produce 20,000 cu ft of hydrogen an hour (standard units). Raw material: Natural gas. The process is much less expensive than the electrolytic method, claims Surface Combustion Div., Midland-Ross Corp., Toledo, Ohio.

ON THE BEAM—Two electron beam melting furnaces aren't enough, thinks Wah Chang Corp., Albany, Oreg. It has ordered a third to increase production of high purity refractory metals, cut volatile impurities. A 2500 lb columbium ingot 16 in. in diameter has been produced with present equipment.

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As the operator watches, a hardened steel wheel rolls a fusionwelded seam, producing an aerodynamically smooth joint. Built at North American, this roll planisher exerts pressures up to 19,000 lb to remove shrinkage and improve the weld

Solved: Mach 3 Manufacturing Problems

Production men at North American Aviation are starting to build the first of our B-70 bombers, but they first had to get over a host of metalworking barriers

This welder, resembling a Space Age surgeon, probes an opening in asbestos blankets to weld a part that has been heated to about 600° F. Elevated temperature welding minimizes distortion and cracking

THE FIRST flight of the giant B-70 will be the culmination of a series of metalworking achievements.

Engineers and production men at North American Aviation Inc., Los Angeles, makers of the 2000 mph airplane, say it couldn't have been built two years ago. Many manufacturing steps have been invented, revamped, or refined to make the silver bird.

Much of the B-70 Valkyrie will be covered by a steel skin only 0.006 in. thick—about like metal foil.

One production man says: "It's harder to handle than paper. If you get any wrinkles in it, it won't meet the specs.

"No machines had been built to handle the stuff."

To handle "the stuff" through machining, forming, welding, brazing, heat treating, and a host of other specialized manufacturing steps, North American's management set up a Manufacturing Development Program covering 28 major projects. The program eventually wound up as a co-ordinated effort on the part of all North American divisions and most of the B-70 subcontractors.

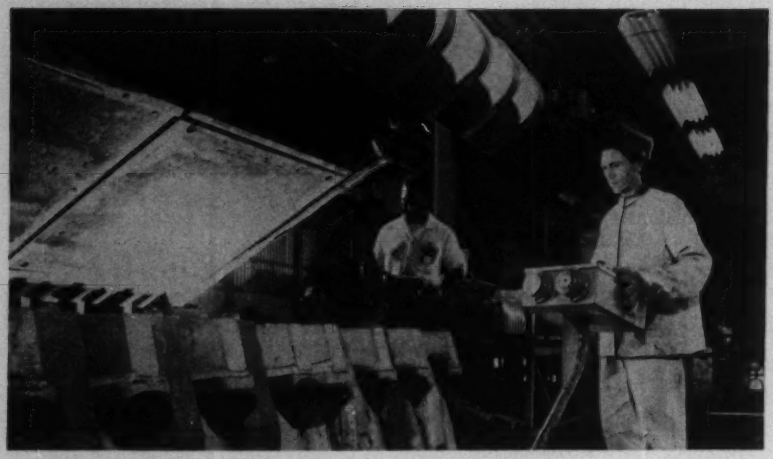
• **Welding**—Conventional welding techniques puckered and warped the flimsy skin metals beyond allowable tolerances. Yet there will be more than 19,000 ft of fuel-tight fusionwelding alone in the Valkyrie. Most will be done on automatic machines. Fourteen operators had to be trained for the new jobs.

A great deal of hand welding (where warping is greatest) is being done. The problem has led to elevated temperature welding. Some parts are heated electrically; some are put in a furnace before and after welding. Welders often can be seen working over a pile of asbestos blankets, probing through an opening to the 600° F metal part.

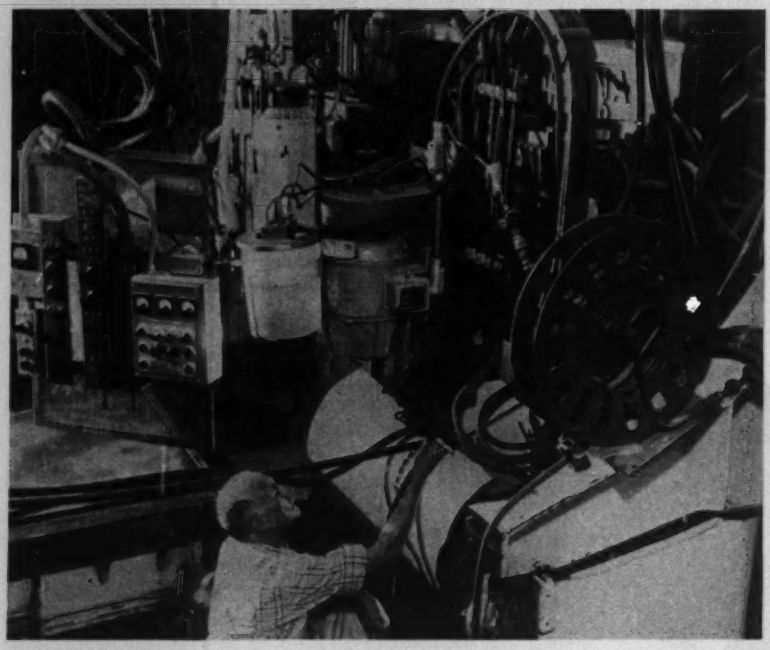
• **Forming**—Heat has also helped solve the problems of forming some of the new supermetals. Hot sizing is an example. Blanks of steel are placed between shaped dies. The tooling is heated electrically to about 1200° F for about 5 minutes,

Honeycomb panels, immersed in water, are traversed by an ultrasonic head that checks the brazed joints. Results are recorded on paper

A bank of quartz lamps (center) will be rolled in place to heat the sheet steel blank as it is stretched over the curved male die. Normal stretch temperature is 400° F



Jaws of this hot size press are heated to about 1200° F—so the part is heated and formed at the same time. Springback and wrinkling are eliminated



The addition of pipes, tubes, and conduit has converted a skin mill to an electrolytic grinder

during which pressure is applied. Heat also is used in stretch forming. Quartz lamps roll into position to heat the workpiece as it's pulled over a curved male die.

Some steel parts are subzero formed. Parts are first heat treated, then held in a fixture and taken to minus 100° F. The step fixes them in the required shape. A subsequent 5 hour heat treatment develops the required strength properties.

• **Machining**—Thin metals pose a machining challenge. Yet precision work is a must because an extra 0.001 in. in skin thickness would add a ton to the B-70 bomber's takeoff weight.

The machining challenge is met with equipment modifications and some new machines. Several of North American's, large, numerically controlled machine tools have been converted from their light duty aluminum jobs to the relatively slow, rugged cutting of steel. A skin mill has been adapted to electrolytic grinding.

A Farnham steel-cutting spar mill, just installed, has a 114 ft bed. It will mill long stock to tolerances of 0.0005 in.

• **Brazing** — Steel honeycomb will cover about 75 per cent of the airplane's surface area. Brazing techniques had to be refined for such parts. North American experts have settled on four methods.

The luminous wall furnace method is used for large parts with moderate contour. Salt bath brazing (parts are immersed in molten barium and sodium chlorides) is used primarily for small, flat panels. The electric blanket method, having a ceramic form to control the shape, is used for severely contoured parts. Finally, some parts are brazed by the die quench method, in which the part is held to shape under pressure while cooled.

In all cases, brazing is done near 1625° F. All parts must be hospital clean—a fingerprint on the metal will prevent proper brazing. Materials are prepared in a temperature controlled, dustfree room. All handlers wear white cotton gloves.

North American is also utilizing an equipment advance, remote brazing. An induction coil can be as far as 100 ft from its generator. So brazing of couplings on steel tubing can be done on the airplane during fabrication.

• **Inspection**—Following the adaptation of machine welding, an "in-motion" x-ray technique was perfected to inspect the long seams. A moving x-ray can look into weld seams at rates up to 24 in. a minute.

To check the bond on honeycomb, x-ray was first used. Then the development program produced an ultrasonic inspection machine. Finished panels are submerged in a tank of water. A scanning head traverses, bouncing sound waves through the panel. The result is a permanent visible record on photosensitized paper, showing every hairline of honeycomb core that has brazed to the skin and pointing up any areas that have been missed.

Those techniques, and others equally specialized, are turning out our first Mach 3 manned airplane. They represent Space Age advances in our manufacturing ability, and more are on the way, say North American engineers.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Irradiation of Aluminum Forms Negative Ions

Aluminum foil is the key to a new method of producing negative ions with a standard lamp, reports Carl L. Olson, general manager of General Electric Co.'s lamp research center at Nela Park, Cleveland.

Developed by Dr. David O. Fleming, scientist in GE's radiant effects laboratory at Nela Park, and Dr. S. K. Guth, laboratory manager, the method promises a more efficient, less costly process for generating the negative ions in air, researchers believe.

• The discovery makes it possible to use standard commercial germicidal lamps to create negative ions.

Both positive and negative ions normally exist in air. They are generally present in pairs, and the numbers depend on conditions. Produced in nature by thunderstorms, cosmic rays, winds, ocean spray, ultraviolet radiation, and radioactivity, ion pairs occur more often in a clean atmosphere. Presence of manmade debris (smoke, dust, fumes, and other particles) reduces the number of ions and a greater toll is taken of the negative particles. Claims have been made that negative ions have therapeutic advantages.

• Researchers found that when light from a germicidal lamp strikes aluminum foil, electrons are freed; combining with molecules in the air, they form negative ions.

Negative ions can be produced by special lamps, radiating light well into the ultraviolet (1849 millimicrons). Such lamps require a special glass to avoid absorbing the radiation in the lamp itself; in addition, the efficiency of the energy conversion is low. The germicidal lamp uses ultraviolet light of a longer wave length (2537 millimicrons), where the energy is more easily converted and the glass requirements are easier to meet. While light of the longer wave length is ineffective in producing ozone, it will kill airborne bacteria and mold spores.

In producing the ions, the lamp and foil are enclosed in a chamber.

Metal pellet, heated by a short pulse of high density electric current from the welding gun, fuses and fills an imperfection in the mold surface

Die Repair Time Reduced By New Welding Technique

SCRATCHES, cavities, and undercuts on injection molding dies can be repaired in minutes by Dot Welding, a process developed by Mid States Welder Mfg. Co., Chicago.

• A metal pellet is fused into the damaged area of the die with a gun type welding device.

The metal pellet is heated to fusion temperature by a short pulse of high density electric current in the welder. Then the metal flows into the scratch or cavity.

The die can be filed or finish ground, making the repair almost invisible, only a few minutes after the weld has been made.

• The die doesn't have to be removed from the machine for repairs, and it doesn't have to be preheated.

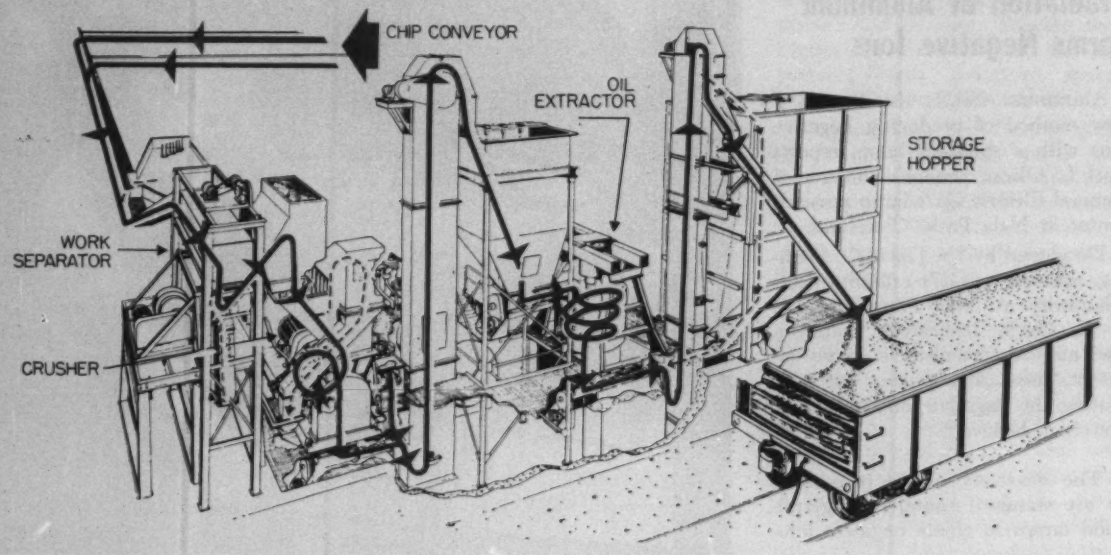
Downtime is reduced at Ostrom Tool Co., Chicago, by repairing dies while they're in the machine. When the previous repair method was used, die setups often had to be knocked down, and the dies were sent to outside welding shops. The dies often had to be reset for the same machine after repairing.

Dies don't have to be preheated for Dot Welding because the weld is confined to a small area. Preheating, required in the previous repair method, burned the finish polish off the die.

• Sometimes the process saves half finished molds from the scrap heap.

Flaws in castings or forgings often go unnoticed until considerable machining has been done. The parts can't be discarded without a loss in labor and material. The answer: Complete the parts and repair flaws by Dot Welding.

Imperfections in molds for plastic television lenses had to be repaired after machining at Ostrom Tool. Dot Welding was the only repair technique that could be used economically. The company estimates it saved $8000 by saving the mold.



Chips flow (blue lines) through a recovery unit. It produces uniformly crushed chips which are spun dry in an extractor, then stored in a 1400 cu ft, dry storage bin, or loaded into railroad cars

Automatic Chip Handling, Oil Recovery Pay Off

- **Oilfree, uniform chips bring higher scrap prices.**
- **Cutting oil consumption is reduced via recovery.**
- **Plant housekeeping is improved.**
- **Rail car capacity is used more efficiently.**
- **Demurrage is cut by chip storage facilities.**
- **Manpower normally required for cleanup is released.**

A CONTINUOUS metal chip handling and cutting oil recovery system will amortize itself in about two years at the bearing plant of Link-Belt Co., Indianapolis.

The system continuously conveys metal turnings from two lines of automatic screw machines. It crushes turnings to a uniform size, extracts and sterilizes cutting oil from the chips, and stores and loads the oilfree chips into railroad cars.

• **Clean Chips Bring Premium**—Oilfree turnings crushed to uniform size bring a premium of $3 to $4 per ton.

The system reduces cutting oil consumption by 50 per cent. Even after the oil has drained from the conveyors, about 1 gallon can be extracted from each cubic foot of chips. At a handling rate of 144 cu ft of chips an hour, 144 gallons of oil are recovered. Saving: $47.52 an hour, $380.16 in 8 hours.

• **Improved Housekeeping** — Manual handling of oily turnings is eliminated by conveyors feeding the system. They continuously carry turnings away from screw machines. Tote boxes and oily containers are eliminated from the machine area.

• **Uniform Car Loadings**—Crushed chips fill a gondola car efficiently and make it possible to load cars nearer maximum capacity by cutting storage space requirements 75 per cent. Long bushy turnings fill a car before minimum weight is reached and result in tariffs based on unrealistic weights.

Excessive demurrage charges are eliminated by providing a storage bin which holds a carload of crushed chips. The control gate and unloading chute allow a 1500 to 1800 cu ft gondola car to be loaded in about 30 minutes.

• **Floor Conveyors** — Two, 18 in. wide by 363 ft centers drag chain conveyors are mounted in a trench beside each line of automatic mul-

Oily, bushy metal turnings (right) are hard to handle and require more storage space than the dry, crushed chips that have been processed (left)

tiple spindle bar machines. The conveyors receive metal turnings from the machines and carry them to a 24 in. drag chain conveyor running at right angles to the two conveyors serving the machines.

The 24 in. conveyor carries the turnings to the chip processing area and elevates them to a work separator, ahead of the crusher.

• **Crushing and Extracting**—Turnings are separated from large pieces of scrap by a high velocity air jet. They are blown into a hopper, and the foreign material drops into a scrap chute. The turnings are gravity fed to a ring crusher which breaks them into chips about fingernail size. They fall through grate openings in the bottom of the crusher to a discharge surge hopper.

A short screw feeder in the bottom of the surge hopper moves the oily chips to an elevator. This carries the chips into an extractor feed hopper where they're fed into a 48 by 20 in. extractor by a short screw feeder. The extractor works on an automatic cycle—loading chips while rotating at half speed, spinning at full speed for a predetermined time to extract oil, then stopping to discharge dry chips.

• **Dry Chip Handling**—When the extractor stops, dry chips fall into a surge hopper under the extractor. A short screw feeder delivers the drop chips from the hopper to a bucket elevator serving a 1400 cu ft bin (about two days' storage for the plant). Using the flop gate, the chips can be fed to a telescoping chute for loading directly into a gondola car.

• **Oil Purification**—Heating the oil to 180° F kills dermatitis-causing bacteria. A sludge collector removes metal filings, dirt, and sludge. In another compartment, oil circulates through a high speed centrifuge which separates water, soluble coolants, metallic sediments, and dirt. Prior to re-use, the oil is stored in a 1000 gallon tank. The company says the cleaned cutting oil is as good as new.

The system was acquired from the Turbine Equipment Co. (New York) as an addition to Link-Belt's line of material handling and processing equipment.

Metal Identifier

A meter and file are all you need to tell the difference between atomic reactor metals

SORTING metals that look alike is inexpensive and easy with a device just developed by the Knolls Atomic Power Laboratory (KAPL), Schenectady, N. Y.

It differentiates between Inconel and stainless, Zircaloy 2 and zirconium or hafnium "quicker than you can bat an eye."

Those metals are widely used in Naval reactors being developed by the laboratory which is operated by General Electric.

• **George Martin of KAPL's mechanical equipment development section invented the instrument: It consists of a standard milliammeter with two leads attached to a clamp and a small carbon steel file.**

Metals are tested simply by attaching the clamp to and rubbing the file briskly against a metal sample. Rubbing generates a tiny current (about 5 to 10 milliamperes for stainless or Inconel) which the meter registers on a dial.

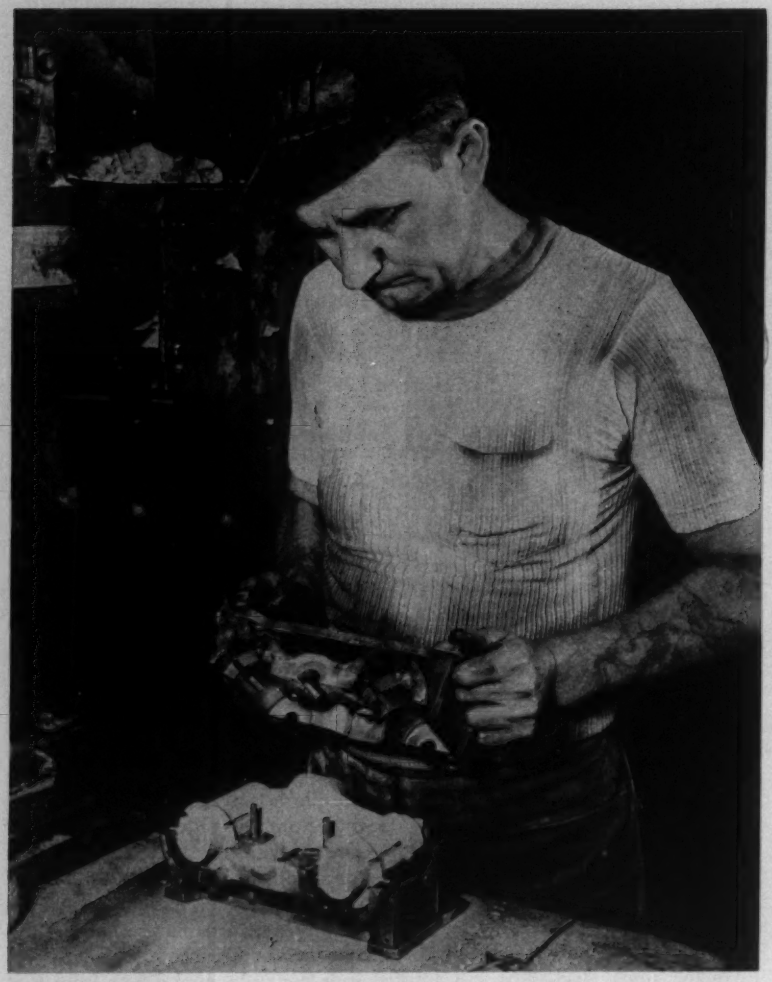
Mr. Martin explains that the device works because the polarity of stainless or Inconel differs from that of the carbon steel file. Friction between the file and sample produces a local hot spot sufficient to produce the current.

• **It can be used to test thermocouples.**

The nuclear, heat treating, and chemical industries use a lot of thermocouples. They can be easily hooked up incorrectly. The Martin device can quickly determine polarity and eliminate much wasted time.

KAPL's field inspectors made the original request for testing equipment. Even with good stock control, it was not uncommon for metals to get mixed up, a serious problem when dealing with atomic reactor components.

Available test equipment was too expensive or too complicated. An eddy current machine, for example, cost $800 and required a trained operator. The mechanical equipment section developed six models of the Martin tester for less than $300.



Coremaker shows easy, clean release of blown core from corebox, said to be typical characteristics of rammed or blown cores made with corn-derived binders

Cereal Binders Up Quality, Slash Casting Costs

They improve core properties and cut drying time, states foundry. Improved inside surface cuts finishing time. Fast, easy knockout is also claimed

MANY foundrymen are finding that corn-type binders improve the properties of green sand, speed core baking 30 to 50 per cent, and upgrade the as-baked surfaces of cores.

Castings made with such cores have smoother internal surfaces—reduced veining, penetration, and burn-in not only improve quality but reduce grinding and cleaning time, states Riverside Foundry Co. Inc., Wrightsville, Pa.

• Inconsistent results in experiments to increase green and hot strengths led to trials of a dry cereal binder for green strength and a new type dry binder for baked strength.

About 10 per cent of Riverside's output is a wide variety of small components for specialty consumer products. The rest is straight jobbing, chiefly gray iron and aluminum gas burners, sprockets, and pump housings. Many cores have sharp edges and high standing parts. Some cores are dried standing, but many are placed in supporting dryers.

Green strength and dry strength binders are compatible with one another and sand, says Riverside. The green type minimizes sand brittleness and friable edges. It controls sand expansion, permeability, and contributes to several effects of the dry binder.

The dry material is a white, water-soluble powder made of corn sugar and a small amount of catalyst. It turns into a resin like substance during baking, bonding the cores to resist heat shock.

Cores are baked until dark brown or black (400 to 450° F). The mixes are used either on benchwork or core blowers.

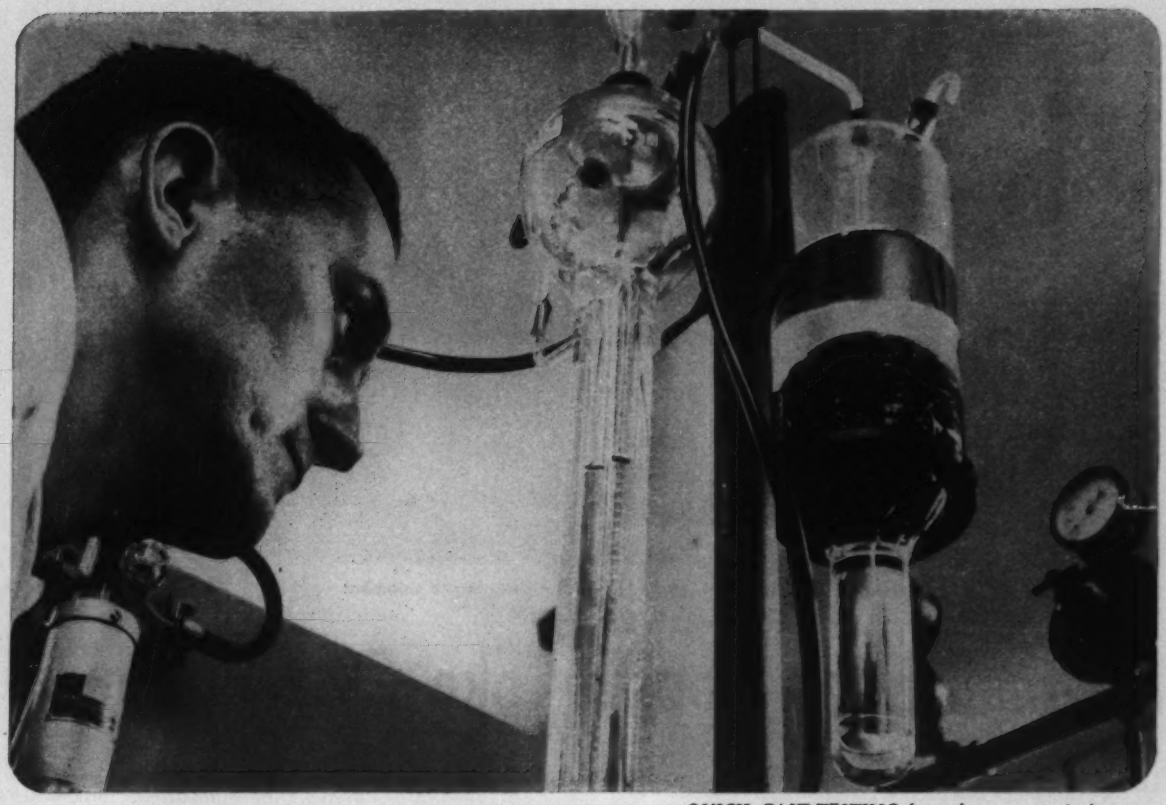
• Moisture content has an important influence on the performance of core mixes.

All mixtures of the dry and green strength binders require more moisture than previous oil-bonded sands, says Riverside. Too much moisture lowers green strength but increases hot strength—the sand also gets too sticky, prolonging baking time. The ideal is 3.3 per cent moisture for cast iron and 3 per cent for aluminum. Riverside checks the moisture content of each batch of sand before it's delivered to the coreroom.

Other observations: Flowability improves with blending, but overmulling makes the mix too stiff. Cereal and dextrose complement one another when combined in the proper amounts. Fast knockout is another feature—cores collapse well after burnout.

Riverside uses binders furnished by Corn Products Co., New York.

***Experience**—the added alloy in **Allegheny Ludlum** tool steels*



QUICK, FAST TESTING for carbon content is done not once or twice but 8 times per melt in A-L's Chem Lab with this direct reading Leco carbon determinator.

Carbon content checked 8 times during melt to guarantee A-L tool steel hardenability

Lab tests for carbon eliminate your guesswork; provide high hardness, uniform hardenability, reproducible tool performance.

Because carbon has the greatest influence on hardenability, Allegheny Ludlum watches it carefully during the melt. Testing a specimen for carbon takes only a few minutes. Therefore, A-L checks for carbon content 8 times during the melt, and makes the necessary adjustments to insure accurate control of carbon. This control means Allegheny Ludlum can hold carbon content to a closer range than most customers specify.

Carbon control at Allegheny Ludlum assures you of precise response to heat treating. This control in the melt brings you predictable, *high hardness, uniform hardenability* and *reproducible tool performance.*

This is just one of the many things A-L does to insure high quality. Here are some others: close control over forging techniques, rigid temperature-time programming, careful testing of billets prior to processing to insure good surface and sound interior, control over annealing to give you the right hardness for your exact machining operation, thorough metallurgical testing to insure top tool steel quality and meeting of your specifications.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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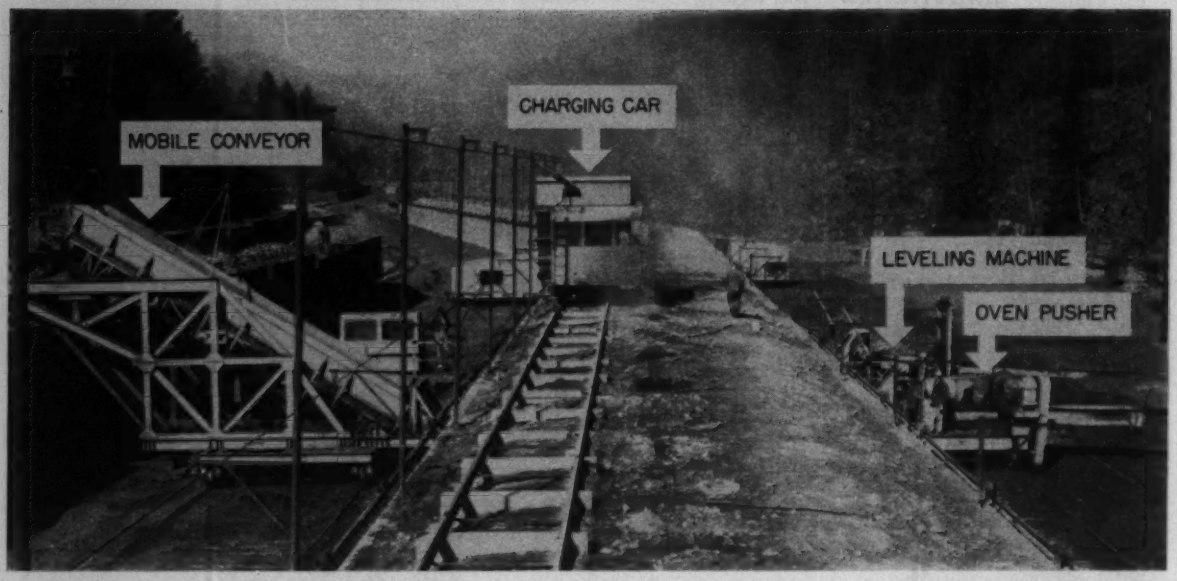


Job tailored handling equipment insures efficient coke making, from charging to shipment

Mechanization Boosts Coke Oven Output

Larry cars load coking coal in the ovens; a leveler distributes the charges; a pusher shoves finished coke from the ovens to a conveyor that puts it into rail cars

PRODUCERS of metallurgical coke are putting more emphasis on coke quality, giving less attention to by-product recovery, and making every effort to increase production by mechanizing.

Equipment that daily charges and pushes 90 rectangular coke ovens of the nonrecovery type has been put into operation by Stonega Coke & Coal Co., at a new plant near Big Stone Gap, Va.

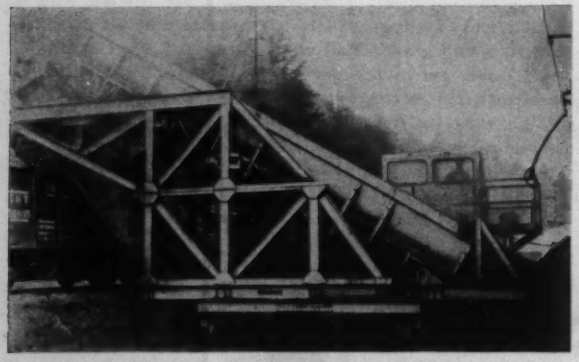
Two charging cars, a leveling machine, an oven pusher, and a mobile, car loading conveyor were supplied by Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

• Mechanized ovens are designed to produce about 650 tons of coke a day. Raw material: Slack coal from the company's processing plant.

The coking plant consists of three, 60 unit batteries of Mitchell-type ovens. Each unit has a charge capacity of 12 tons and turns out more than 7 tons of low ash, low sulfur coke per charge.

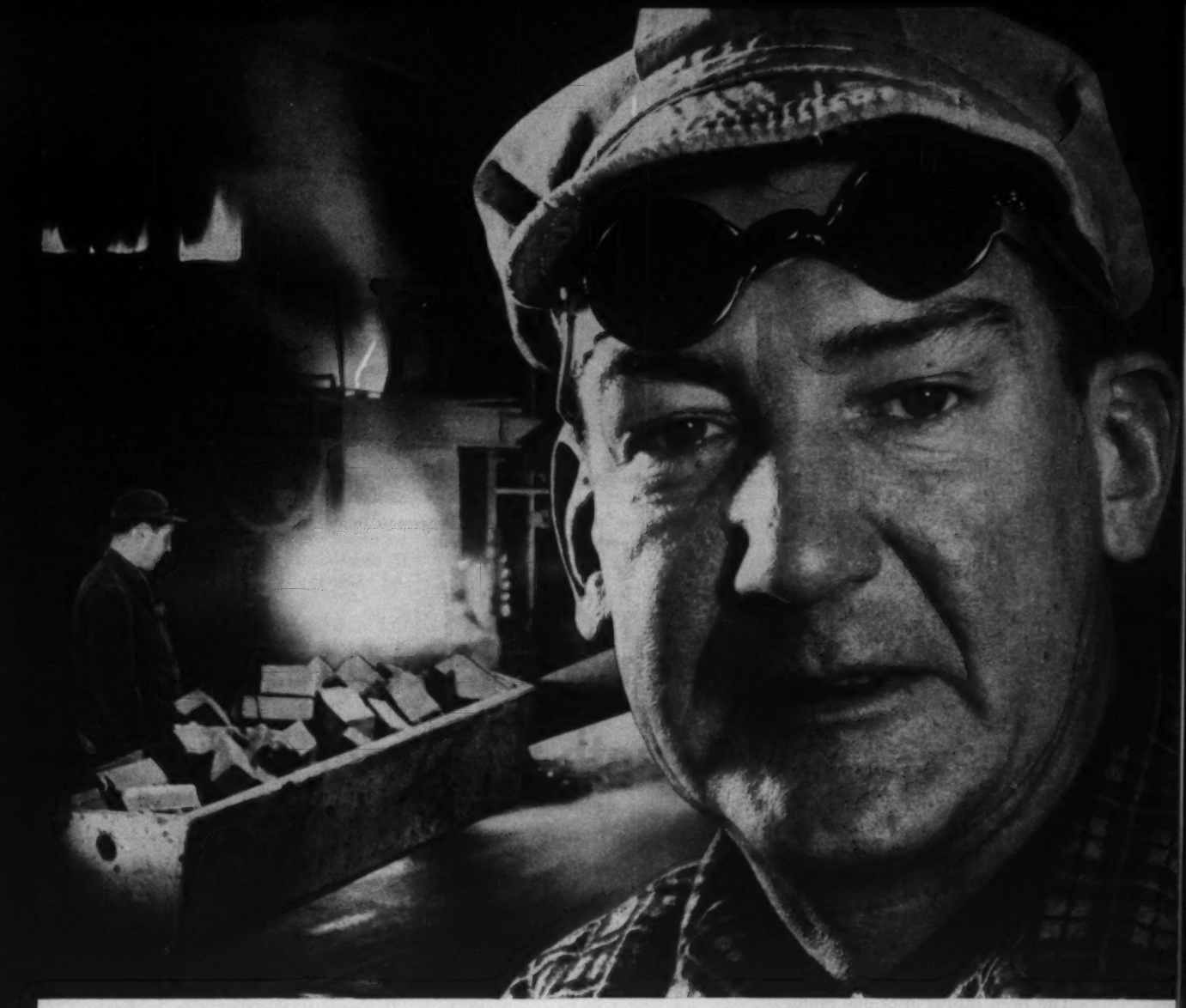
Coal travels from the mine to a cleaning plant on a conveyor belt. It is wet washed and separated; material smaller than ¼ in. is processed further and used as coke oven feed. Processed material is taken by conveyor to a storage area.

Stored material is bulldozed into a



Mobile conveyor, on wide gage track behind the ovens . . .

. . . Loads railroad cars with coke ejected by oven pusher



"This new SIMPLEX ferrochrome melts like butter"

The fastest dissolving low-carbon ferrochrome for stainless steel is new SIMPLEX ferrochrome. Ideal for use during slag reduction or finishing, the alloy penetrates the slag easily and provides rapid cooling of the bath. Its carbon level is so low—0.010 or 0.025 percent maximum carbon—that additions generally lower the bath carbon content. And it is one of the lowest priced low-carbon ferrochromes available.

Ask your UNION CARBIDE METALS representative for additional information about this unique new alloy.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.
In Canada: Union Carbide Canada Limited, Toronto.

For more facts on rapid solubility, write for this new six-page SIMPLEX ferrochrome folder.

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hopper and transferred by a vibrating feeder to a belt conveyor, which carries it to a cone type surge bin above the larry tracks.

• Larries running on a track above the ovens carry coal from the surge bin.

Coal is loaded into the larries through an opening in the cone. Flow is controlled by a horizontal, sliding gate, actuated by solenoid valves. Loading takes less than 2 minutes.

The 12 ton oven charge is weighed by a track scale. Charge weight is set on the scale; the larry operator starts a hydraulic pump to operate the surge bin gate. When the specified load has been dumped into the car, a mercury switch operates a solenoid valve to close the gate.

Coal is transferred from the larries to the ovens by drag conveyors.

• The coal leveling machine and the oven pusher run on the same 10 ft gage track.

Traction and ram power for the coal leveler are supplied by the same motor. Another motor elevates and lowers the ram.

The ram box is trunnion mounted at the oven side, with hydraulic piston and counterweight suspension at the rear. Elevation can be adjusted at the trunnion by independently powered hydraulic cylinders.

The oven pusher uses one motor for traction and ram power. Interconnected clutches cannot be engaged simultaneously. The pusher ram can be operated at 20 to 40 ft a minute.

• Mobile conveyor carries coke from ovens to railroad cars.

The conveyor travels from oven to oven on 14 ft gage tracks. It has a maximum speed of 100 ft a minute. The unit is 45 ft long; slope can be set at 27½ to 32½ degrees to load railroad cars on tracks 4 ft higher than the conveyor rails.

A receiving hopper at the feed end of the conveyor is hinged to rest on the oven hearth plate. A 1 in. mesh, vibrating screen is mounted on the exit end of the conveyor.

The A3J Vigilante, the Navy's newest supersonic fighter, transmits loads well over 100,000 lb on each main landing gear

Tough Steel Features High Strength-to-Weight Ratio

Supersonic aircraft for carrier service must have tough landing gear components. A high strength alloy furnishes the muscle and also reduces the weight of the part

USS STRUX, a steel with a promising strength-weight ratio, is hailed as a contender in the aircraft and missile industries by U. S. Steel Corp., Pittsburgh.

The alloy is being used in landing gear forgings for the Navy's newest jet plane, the A3J Vigilante. The landing gear must be light for good flight performance and tough to absorb the impact of high speed landings on aircraft carriers.

Each main gear, for example, must withstand loads that can run well over 100,000 lb as it hits the deck and jolts to a stop.

• Properties — The steel can be forged, machined, and heat treated to develop strengths of 280,000 to 300,000 psi. Compared with SAE 4340, it is 7 per cent stronger and permits an equal percentage reduction in weight.

The carbon range (0.40 to 0.50 per cent) permits a low tempering treatment and yet achieves a minimum tensile strength of 280,000 psi in sizes normally used for landing gear. The steel has sufficient hardenability to form martensite through sections exceeding 4 in. in diameter.

Transverse tensile properties, critically important in this type component, are high and uniform. Tests made from ingot samples establish ultimate tensile strengths well within 280,000 psi.

The alloy is sold in the hot rolled or annealed condition. Available forms include a full range of bar sizes, and blooms and billets up to 15¾ in. square.

Unit Guides Welder

Combination of fixed cams and mechanical probe insures perfect automatic joints in car frames

A NEW tracer welding system joins metal parts with untrimmed edges in a continuous, automatic operation, says Expert Welding Machine Co., Detroit, the developer.

The product: Automotive frame side rails and crossmembers.

• The vertical contours of side rail and crossmember channels often deviate from print dimensions as much as 3/16 in., and the contours are not consistent, so a totally cam controlled machine can't be used.

A tracer system was developed that compensates for deviations. It accurately follows and correctly positions the welding torch.

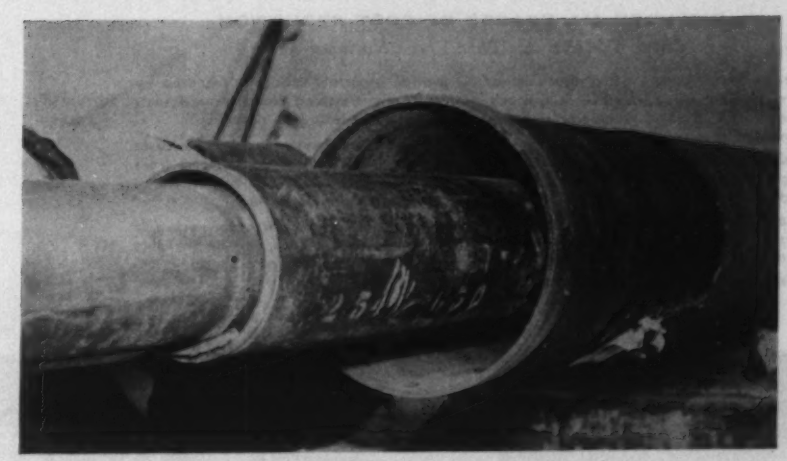
The welding head carriage follows contours through cams built into the machine. A mechanical probe connected to the tracer system also follows the joint. The difference or error between the design and actual contour is transmitted to a mechanical memory. At the right time, that information is added to the cam follower to correctly position the torch.

The Expert system has two parts: A mechanical memory unit and a differential and probe system which delivers the stored signal.

To begin, channel halves are manually loaded and press assembled with power air clamps. Assembled side rails are automatically transferred to an idle station and to a welding station. Four welding heads (two on each side) accurately follow the contour of the side rails.

After welding operations are completed, parts are then transferred to an unload station.

The memory unit consists of a drum equipped with setting pins. An input shaft with two cams positions the set pins; position of the memory output shaft is determined by a roller which rides on the pins. Position of the pins corresponds to error or deviation from blueprint dimensions. After the welding torch has joined a point corresponding to a set pin, fixed cams erase the pin positions, readying them for the next pass.



Construction view: The smallest of these concentric pipes transports the sulfur, the median is the hot water jacket, and the largest is the protective casing

High Strength Alloy Pipe Answer to Thermal Stresses

Concentric lines inside protective casing solve expansion problem in carrying molten sulfur. Steel chosen for project eliminates need for joints or loops

A THREE-IN-ONE pipeline to transport molten sulfur 7 miles from a manmade island in the Gulf of Mexico to Grand Isle, La., has been built by Freeport Sulphur Co.

The pipeline consists of three concentric pipes: A 14 in. OD protective casing; a 7⅝ in. hot water jacket; and a 6 in. OD sulfur line.

Jalloy, a manganese molybdenum alloy steel developed by Jones & Laughlin Steel Corp., was chosen for the inner pipes when it was determined they would have to have a minimum yield strength of 60,000 psi to resist thermal stresses. The cumulative expansion of the pipes is about 55 ft when heated from 75° F. It was decided that the use of joints or loops to provide for such expansion might not be effective or would be too expensive.

• **Prestressed** — After laying the pipes, the outer casing is placed in 10,000 psi tension by exerting 270,000 lb pull at both ends of the casing. While in tension, the ends are fixed to an anchor structure. The inner lines are then heated to 225° F and allowed to expand 35 ft normally. While expanded, each end of the inner lines is permanently fastened to the outer casing.

• **Forces Neutralized** — When the temperature in the inner lines reaches 300° F, the thermal stress will be compressive, with combined stresses about 60 per cent of their yield strength. Should the inner lines be cooled to atmospheric temperature, the thermal stress will reverse into tension and combined stresses will amount to about 70 per cent of their yield strength.

As a result, longitudinal movement of the pipeline is negligible, eliminating the need for expansion joints.

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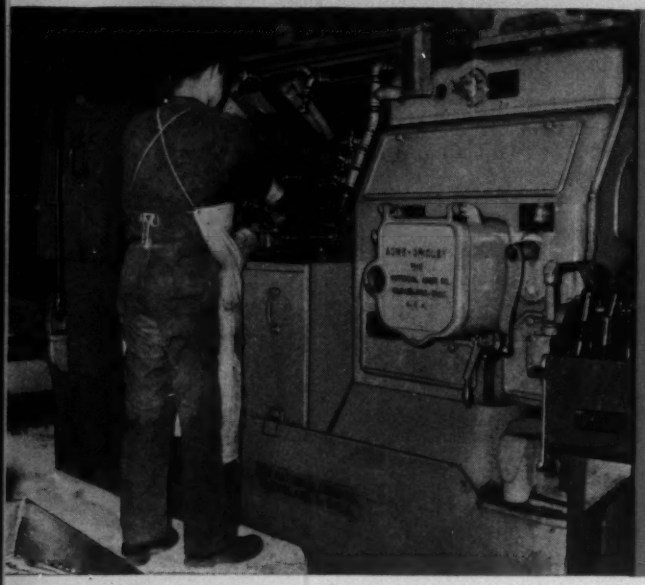
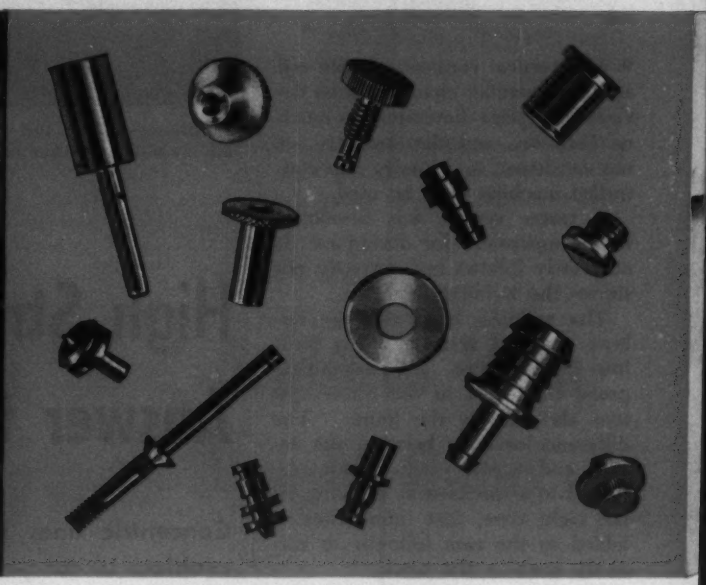




McCULLOCH CORPORATION LOGS 66% COST REDUCTION

. . . with Acme-Gridleys

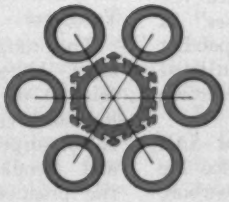
Reduced cost-per-piece of tilt-lock knobs was but one of the enviable savings made possible for the Marine Products Division of the McCulloch Corporation by an Acme-Gridley RA-6 Spindle Automatic. In addition, McCulloch boosted output 200%, practically eliminated scrap losses, and greatly improved finish and final appearance of this small but critical part.

Previous production methods required one primary and two secondary operations. Now, complete machining—including deburring, is done in one automatic operation on the Acme-Gridley.

Dramatic savings in the production of parts like this make Acme-Gridleys a vital, cost-saving cog in McCulloch's highly efficient production set-up. Evidence of this leading manufacturer's high regard for Acme-Gridley efficiency is the fact that 14 different parts for their popular 60HP "Flying Scott" are produced on the rugged, versatile RA-6 Automatic.

It will pay you to thoroughly study the savings possible with Acme-Gridleys. Call, write or wire for complete details on industry's most modern approach to tangible cost reduction.

Pioneer in Circumferential Automation



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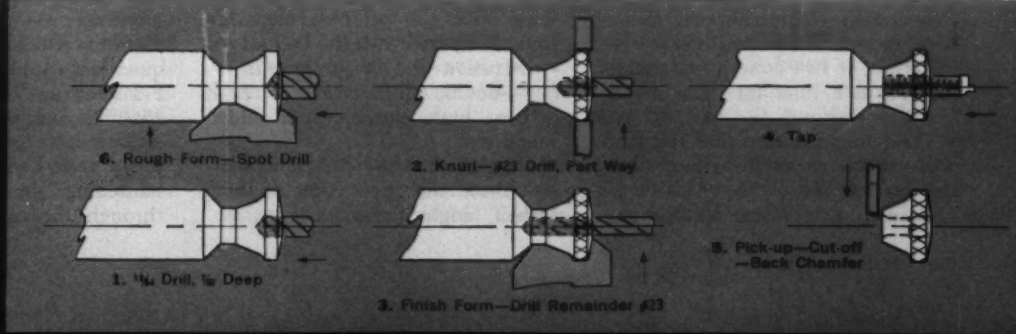
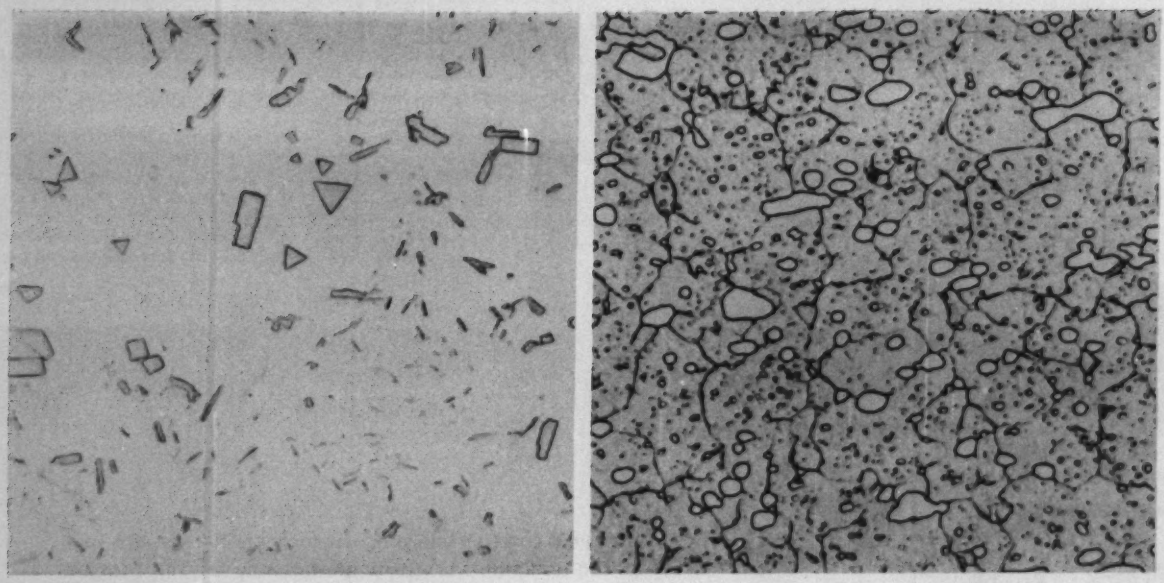

6. Rough Form—Spot Drill
2. Knurl—#23 Drill, Part Way
4. Tap
1. 1/4 Drill, 5/8 Deep
3. Finish Form—Drill Remainder #23
5. Pick-up—Cut-off —Back Chamfer



Photomicrographs compare Hi Wear 64 with high carbon, high chrome alloy. New alloy has angular carbides from tungsten (left), rather than the rounded chromium carbides (right)

New Wear Resistant Steel Is Easy to Heat Treat

Alloy uses tungsten and carbon to form tungsten monocarbides for high hardness. After hardening at conventional temperatures, the steel withstands abrasive wear to give long service life

A NEW ALLOY offers better wear resistance at room temperatures than high carbon, high chrome steels. The producer: Carpenter Steel Co., Reading, Pa.

The alloy has good dimensional stability and is relatively easy to handle in heat treating but doesn't have the red hardness of those requiring higher hardening temperatures.

Applications in tools include many kinds of punches and dies, shear blades, and drawing dies. Other uses: Wear resistance makes it of interest for handling abrasive materials; it has done an outstanding job as a liner for brick molds.

• Field tests indicate that the steel will provide as much as four times the service life of the AISI Type D-2 steels in abrasive applications.

Neil J. Culp, assistant manager of research-metallurgy, and Joseph S. Pendleton Jr., metallurgist, tool and alloy steels, have studied the alloy in a wide range of uses. As a plunger in a die compacting powdered metals, the steel outlasted four high carbon, high chrome plungers. Other tests:

• Shear blades used to cut SAE 1010 strip—double the service life of high speed steel or high carbon, high chrome.

• Brick mold liners, processing silica brick—20 per cent more life when compared with the D-2 alloys.

• Extrusion dies for aluminum alloys—double the wear of high carbon, high chrome with added vanadium.

• Coining dies for nonferrous metals—twice the production of high carbon, high chrome.

• Draw dies, for cold drawing SAE 1020, hot rolled bars—two times the life of D-2.

• Punches used with SAE 1020 and phosphor bronze—15 per cent better life between grinds than D-2.

The secret of longer service life and resistance to wear: Tungsten in the alloy. Combining with carbon, tungsten monocarbides are produced.

The patented alloy, trade named Carpenter Hi Wear 64, has this type analysis:

Carbon	1.50%
Manganese	2.00%
Silicon	0.25%
Chromium	0.90%
Molybdenum	1.00%
Tungsten	4.00%

The tungsten and carbon contents, although higher, are reminiscent of a tungsten fast finishing steel (AISI Type F-3). So it is not surprising that Messrs. Culp and Pendleton suggest following the practices for F-3 steels when grinding parts made of Hi Wear 64. But the new alloy hardens more deeply—parts up to 6 in. in diameter will harden through when quenched in oil from 1450° F. The F-3 steels are brine quenched from 1550° F and develop a relatively shallow case on a softer core. If they are heavily ground after hardening, it is possible to go through the case into softer steel.

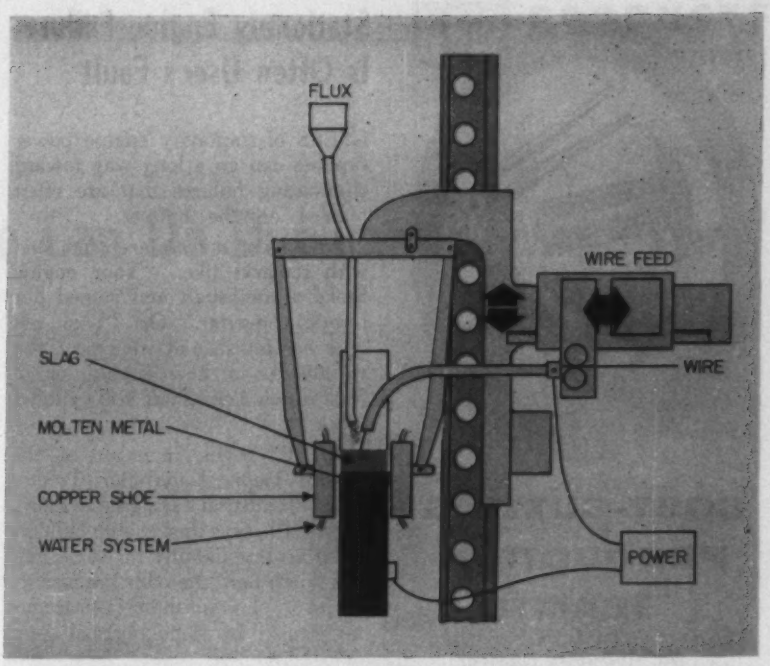
• The alloy can be hardened in air, from 1550° F, if the cross section is 2 in. in diameter or less.

The relatively low heat treating temperatures for such a deep hardening alloy give it additional advantages. The furnaces required for hardening are also used for the normal hardening of carbon and low alloy steels. They need not go above 1600° F, while high carbon, high chrome steels may require up to 1875°. At the lower temperatures, control of the furnace atmosphere is easier, and the decarburization reaction is slower. Result: Easier heat treatment. Salt baths may be used—again, the same types are used for the hardening of plain carbon steels.

As quenched, the hardness is high. From 1450° F, oil quenched samples have a Rockwell hardness of Rc 65 to 66; from 1500° F, hardness increases to Rc 66-67; when air cooled from 1550° F, Rc 62 to 63 will be produced, and increasing the temperature to 1600° F will boost the value to Rc 65-66. For most purposes, optimum tempering temperature is 350° F, with a resulting hardness about Rc 64. That tempering temperature gives minimum distortion or size change and maximum toughness, as well as high hardness.

Increasing tempering temperatures will drop hardness more. For that reason, and since there is little tendency for secondary hardness to develop, normal maximum operating temperature for the alloy is 350° F. At elevated temperatures, the high carbon, high chrome steels have an advantage; while they usually develop somewhat lower room temperature hardness, a value of Rc 59 to 60 can be obtained after heating to 1000° F. Another difference: While Hi Wear 64 can be classed as a nondeforming steel, with a size change after the recommended tempering of less than 0.001 in. per inch, the D-2 types are even more stable dimensionally.

The steel fills a gap between the tungsten fast finishing steels and the high carbon, high chrome types —which Carpenter also supplies. It is expected to find application in many kinds of blanking and forming dies, in forming abrasive materials, and in such things as feed rolls for handling scale covered, hot rolled steel.



Cross section of Vertomatic shows principal features. Varying the oscillation (horizontal drive) produces several nugget shapes. Machine also welds heavy cylindrical tanks, and can be adapted to handle three wires

This Machine Cuts Costs, Speeds Heavy Plate Welding

CONTINUOUS, one-pass vertical welding of heavy sections without elaborate joint preparation and slag removal is the promise of a new electroslag machine christened Vertomatic by the Arcos Corp., Philadelphia.

It can join plates and forgings from 1½ in. to 10 in. thick. More than one machine can be used on thicker material.

Advantages include:

1. On large plates, 50 to 65 per cent less filler metal is needed than is required by competing methods.

2. Flux loss is almost negligible. (Requirements: 5 lb per 100 lb of filler metal.)

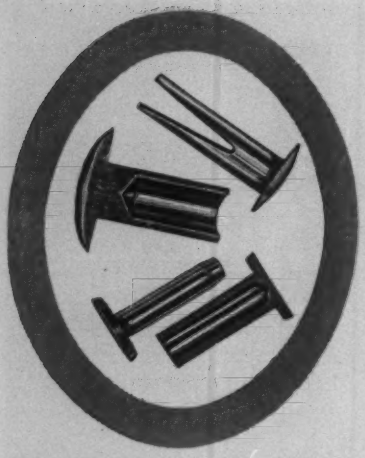
3. The equipment is portable, is easy to set up and operate, and requires no repositioning after the weld has been started.

• The new device is a Belgian import based on a Czechoslovakian design. It handles butt and T joints, corner welds with inside fillets, and reinforcing surface welds.

With a single electrode, Vertomatic lays down 35 to 45 lb of metal an hour. Three electrodes can be used for larger plates giving depositions up to 135 lb per hour.

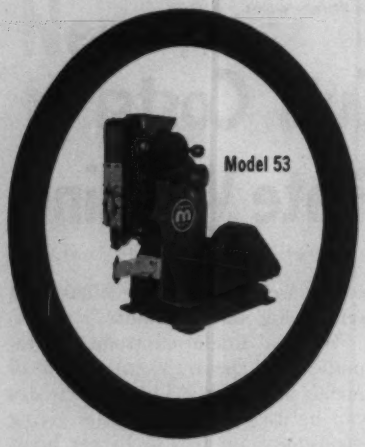
R. D. Thomas, Jr., president of the Philadelphia firm and vice president of the American Welding Society, explains that such deposition rates have significance far beyond the actual figure. "The electroslag method uses only one half as much filler metal to complete a weld in 6 in. plates, mostly through the elimination of grooves common to other methods. In such a plate, a 218 ft joint, for example, that would take nearly 5 hours to complete with submerged arc could be done in less than 30 minutes with Vertomatic."

Cost: $18,000 plus power source (about $3000). Flux cored wire is recommended (48 cents a pound).



COST-CUTTING PRODUCTION TEAM!

. . . the two-way answer to assembly problems!



Here's a combination that cuts production costs and gets rid of assembly problems in a hurry—Milford Tubular Rivets made to high quality standards to assure a better finished product for you . . . Milford automatic rivet-setting machines that can be quickly adapted to your particular fastening needs. Write for more information on how you can put this team to work.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
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Stationary Engine Failure Is Often User's Fault

USERS of stationary engine power supplies can go a long way toward eliminating failures that are often blamed on the builder.

Equipment makers are often met with remarks like: "Your engine broke a crankshaft and ruined our torque converter." Or: "Your engine has failed, and we expect you to give us a new engine, or at least a new crankshaft and cylinder block."

W. E. Irwin, manager of the Service Dept., Caterpillar Tractor Co., Industrial Engine Plant, Peoria, Ill., says that engine builders often assume liability for some failure types, but "the odds are heavily in favor of crankshaft failures being caused by some external force or condition."

• **What To Do**—Misalignment of the engine with power transmission or driven equipment is probably the greatest culprit. Mr. Irwin cites a $10,000 failure, involving both the crankshaft and engine block, caused by inadequate alignment between the inner drum and the outer drive ring of an air clutch. In another case, a power train design allowed a torque converter to exert a heavy linear pull on the crankshaft. Result: The front thrust flange of the rear main bearing became scored and sometimes broke off. The cure: A thrust bearing in the equipment to absorb the pull of the torque converter.

Here are three things to watch for:

1. Avoid side or end loads on the crankshaft. Side loads can break down the oil film, causing seizure. End loads can score bearing thrust surfaces and generate enough heat to cause seizure.

2. Eliminate bending loads. Normally attributed to misalignment, such loads can start a crack in the fillet at the main bearing journal which progresses through the web to the adjacent rod bearing journal.

3. Guard against torsional vibration. Fractures usually occur at a 45 degree angle in these cases. Vibration dampers can keep failure to a minimum, but the damper can become overloaded too.

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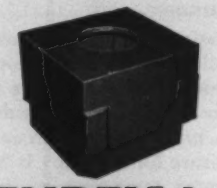

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Stands to reason . . . owner operation logically assures you a more personal attention to your comfort and convenience. Baltimore's best.

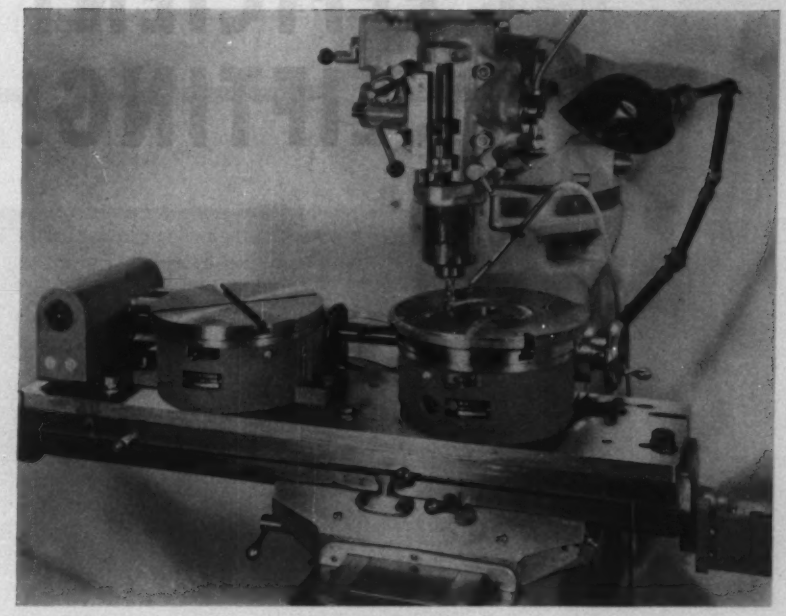
Milling Table Can Do Duplicating, Make Cams

A PRECISION milling table (Roto-Mill) has been designed for single, double, or triple operation for duplicating or making cams. It can be used in vertical position for special jobs or for such jobs as fixturing plate for milling slots in parts.

Equipped with a 110 volt, 60 cycle motor, forward and reverse and variable speed controls are provided. Switches can be attached for milling slots accurately.

You can get milling speeds from one revolution every 10 minutes to 6 rpm. Ample torque is developed by a special warning gear drive, says the company. Backlash adjustment assures milling accuracy. Many different types are available. Units can be made to suit customer's requirements.

For further information, *write* M & M Tool & Mfg. Co., 1124 E. Third St., Dayton 2, Ohio.

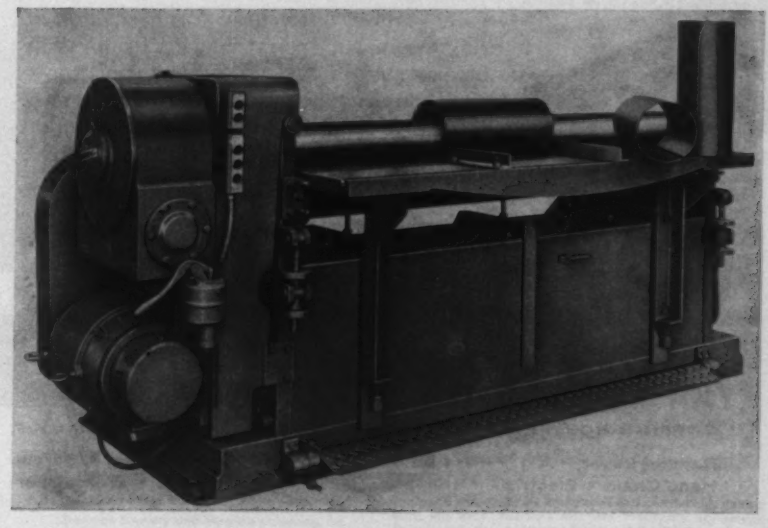


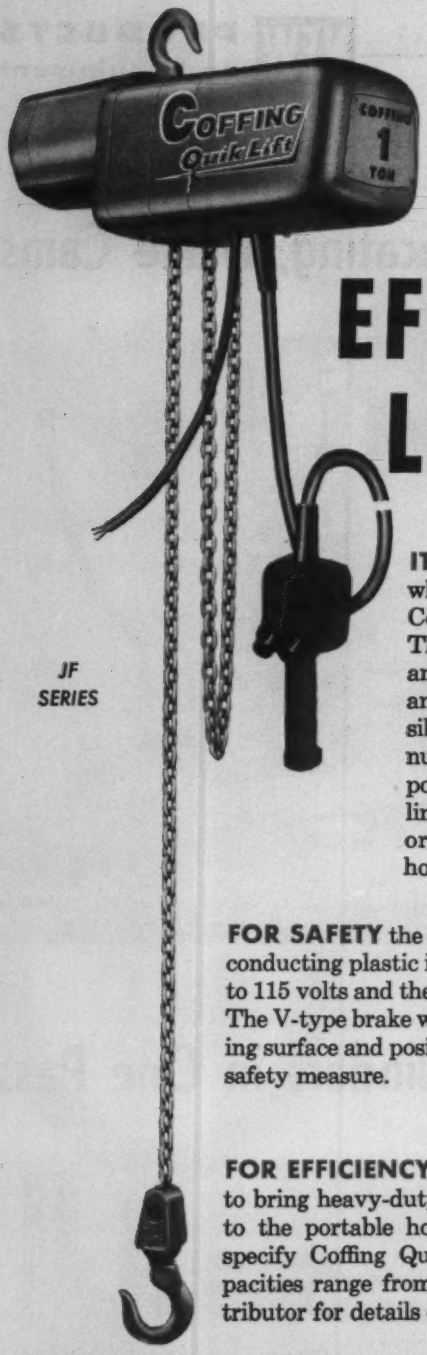
Bending Roll Forms Cylinders in One Pass

PRACTICALLY true cylinders can be formed in one pass on this bending roll. Flat spots are reduced to fractions of an inch without preforming. An adjustable shoe and a specially grooved forming roll cause the stock to start forming almost as soon as it passes through the feed rolls. Close contact is maintained throughout the operation to practically eliminate any flat on the trailing edge.

Standard equipment includes motor and controls, an adjustable table with T-slots for guide arms, a safety disconnect treadle, and an air operated drop end. The machines can be equipped (at extra cost) to feed blanks and remove formed cylinders automatically.

It has a 6 ft working length. Di-





JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

813 Walter Street • Danville, Illinois

COFFING HOISTS

Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS

Ratchet • Screw
Hydraulic • Worm Gear

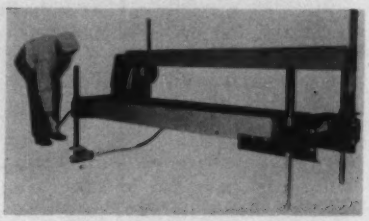
NEW PRODUCTS and equipment

ameter of the feed and forming rolls is 6 in. Capacity is 12 gage mild steel.

For further information, *write* Roll Dept., Wysong & Miles Co., 627 Fulton St., Greensboro, N. C.

Flat Belt Conveyor Adjusts in Height, Length

FLEXIBILITY in bagging operations is provided by the Model GA-11 flat belt conveyor. It's adjustable in height and length. An adaptation of the conveyor allows changes in length from 7 to 12 ft. The standard height of 8 in. can be easily jacked by one operator to any position within a 12 in. range.



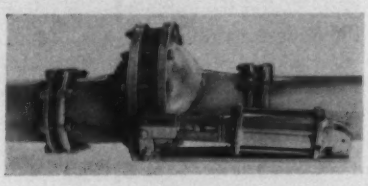
The unit is designed for all package conveying. It can convey filled bags (all sizes) from weighing and packing equipment through a sewing operation. The belt surface is flat with no obstructions or confining braces.

For further information, *write* Richardson Scale Co., Clifton, N. J.

Friction Loss Low in Abrasive Slurry Valve

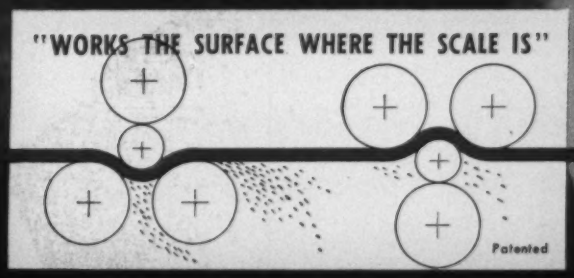
A VALVE for abrasive slurry applications has been developed by United Conveyor Corp. It can be installed in any position and has no slots or guides to interfere with valve movement.

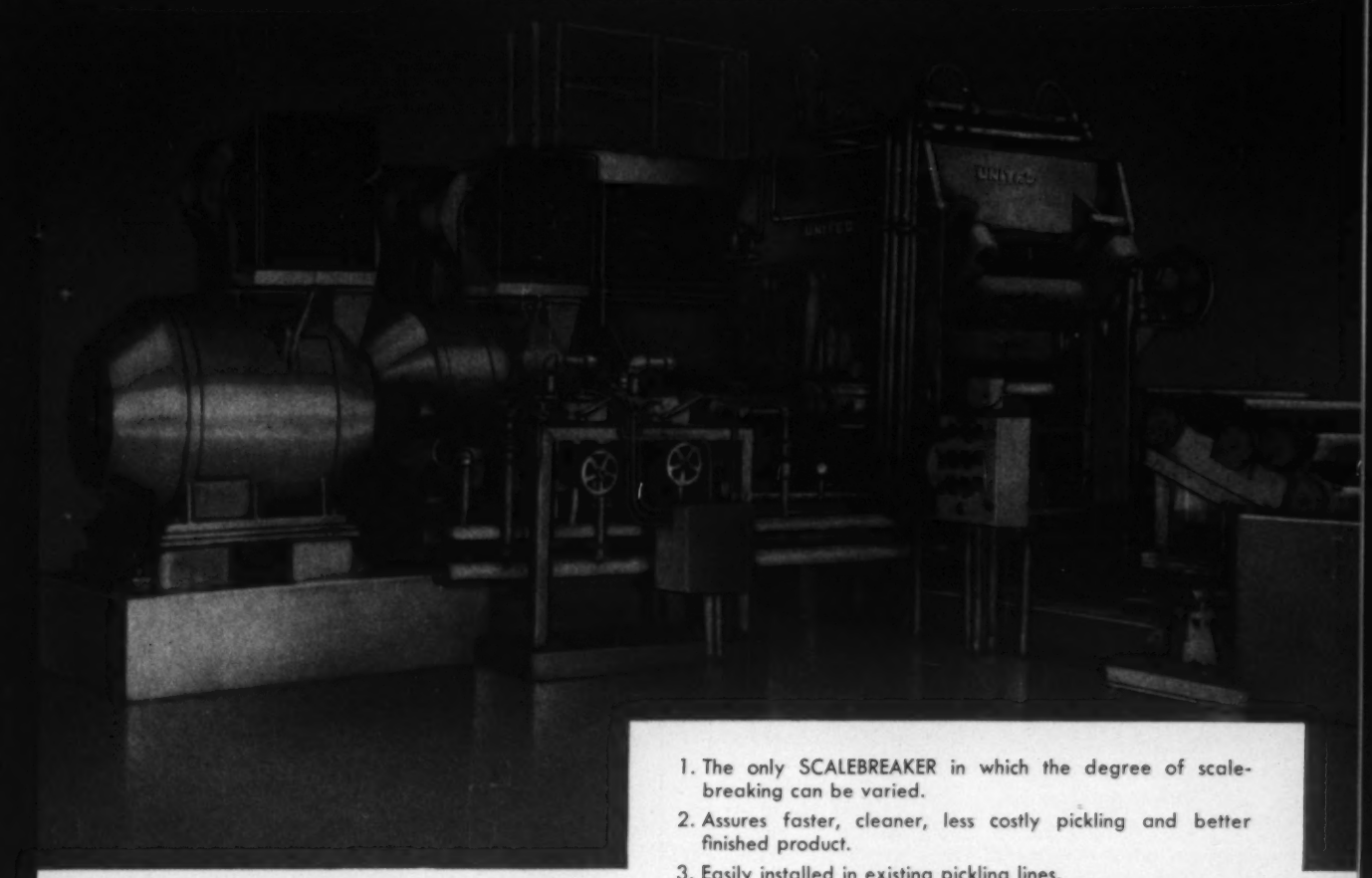
A straight through design minimizes friction loss, turbulence, and wear. Maintenance is reduced to a



UNITED®

NEW *Strip Processing* SCALEBREAKER





1. The only SCALEBREAKER in which the degree of scale-breaking can be varied.
2. Assures faster, cleaner, less costly pickling and better finished product.
3. Easily installed in existing pickling lines.

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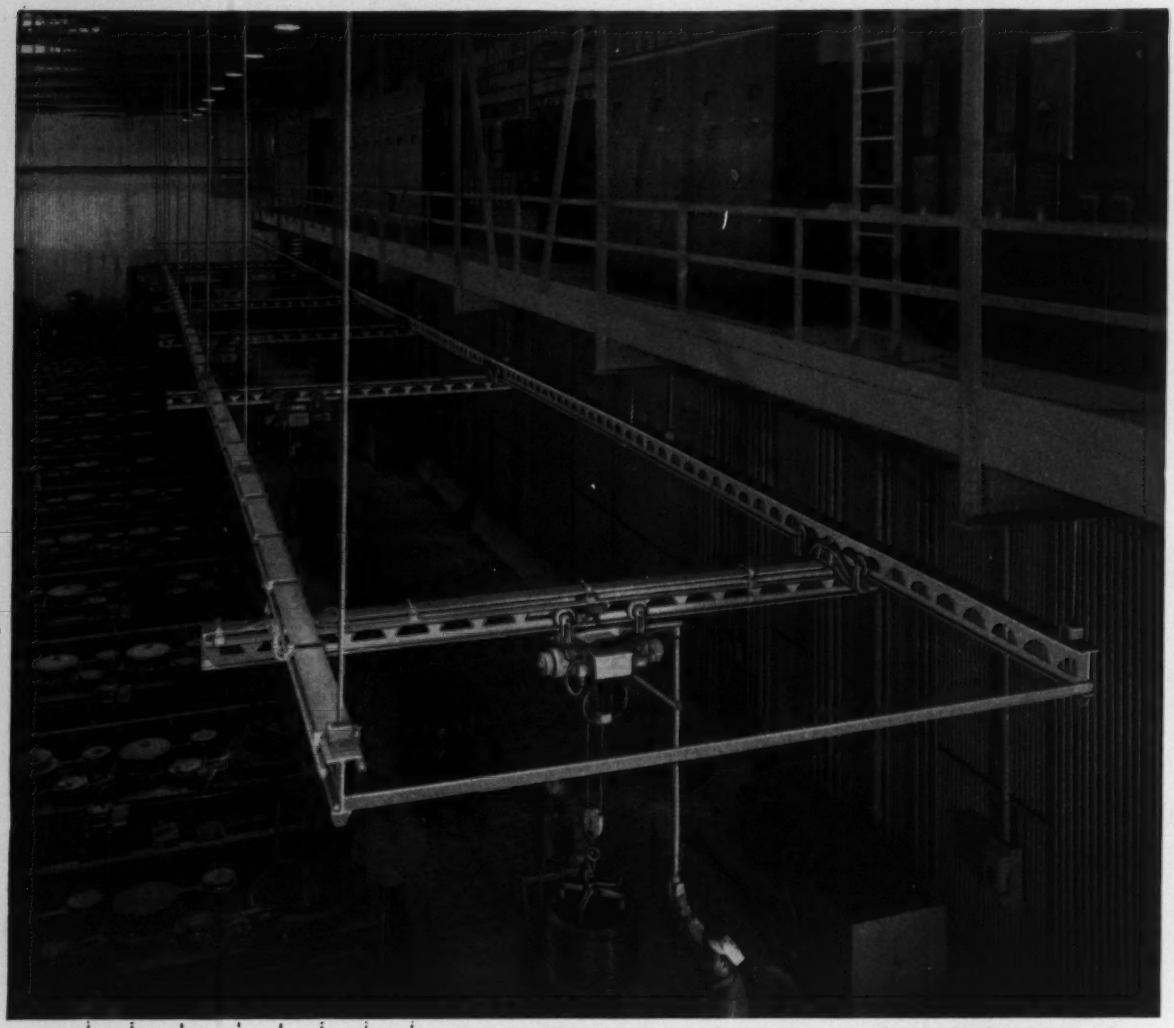
Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



This installation consisting of seven hand-propelled cranes on a flexibly suspended runway is used for stripping wire blocks in a large steel mill.

Note how easy it is with the Cleveland Tramrail design to position the runway at any level or location desired. Likewise, it is extremely simple to dismantle and relocate the equipment to serve some other application, should such ever be necessary.

FLEXIBLE SUSPENSION

Assures Smooth Crane Operation

CLEVELAND Tramrail's unique flexible suspension method of supporting crane runways prevents binding of wheels on the tracks and assures smooth easy rolling operation, regardless of location of the load on a crane bridge.

The floating runways compensate automatically for normal skewing or twisting of crane bridges.

This is one of the reasons why hand-propelled Cleveland Tramrail cranes can be used for so many jobs where motor-driven cranes would otherwise be required.

Operation is so easy that Cleveland Tramrail guarantees a starting effort of 15 lbs. and running effort of 10 lbs. per ton weight.

Write for free copy of illustrated booklet No. 2008, "Engineering and Application Data".

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7812 E. 290 ST. • WICKLIFFE, OHIO

minimum. There are no sliding metal to metal parts. It can be operated remotely by air or hydraulic cylinders. Working pressure is 150 psi.

For further information, *write* United Conveyor Corp., 6505 N. Ridge Blvd., Chicago 26, Ill.

Vacuum Cleaner Picks Up Fluids, Dry Materials

YOU can do many types of industrial cleaning with an air operated, high suction, vacuum cleaner called Air-Vac. Sample jobs include cleaning railroad cars, plating tanks, cracking towers, grease traps, boilers, tanks, sumps (including machine tool and paint spray booth sumps), and floors.

The high vacuum and suction are obtained through a venturi air-jet system.

The unit can pick up liquids at rates up to 2 gallons per second, and provide fluid lift to 25 ft. Dry materials such as sand can be picked up at rates up to 125 lb per minute.

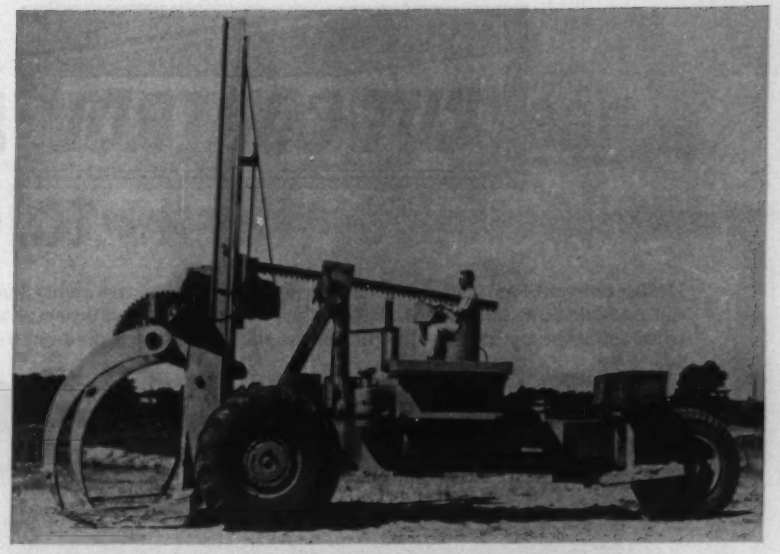
The material picked up by the device is deposited into a 55 gallon drum or similar container. Four hose sizes are available (from 1½ to 4 in.).

For further information, *write* Kimco Products Co., 413 Johnson St., Jenkintown, Pa.

Gas Powered Fork Truck Has 2500 lb Capacity

A GAS POWERED fork truck, Model C-25, has cushion tires and is designed for indoor handling and tiering. Capacity is 2500 lb. The unit has a 64 in. turning radius and requires an aisle 75 in. wide (plus load length) for right angle stacking. It can travel 8 mph both forward and reverse and will climb a 23 per cent grade loaded.

With a standard upright, lift speed is 75 fpm loaded. Lowering speed is 80 fpm loaded. A "Hi-Lo" upright is available. Lift-lower controls and forward-reverse controls are mounted on the steering column. The unit is powered by a



YOU CAN WORK IN UNPAVED AREAS WITH THIS FORK TRUCK. It'll handle loads weighing up to 17 tons. The 5 ft forks can hoist loads 16 ft above the ground. You can get tusks to grip loads. Kicker chains (for ejecting loads) are optional. Power is supplied by a 195 hp diesel engine driving ac and dc generators. Electric switches and potentiometers govern work functions. For further information, **write** R. G. LeTourneau Inc., 2399 S. MacArthur Ave., Longview, Tex.

four cylinder Continental gas engine (112 cu in. displacement) coupled with an automatic Hydra-tork Drive transmission and Clark torque converter.

For further information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Dryoff Ovens Use Steam, Gas Fired Heaters

A FULL range of 24 standardized, monorail, conveyorized dry-off ovens and patch-type drying units has been developed by Ramco Equipment Corp. to integrate with the company's line of power spray washing, phosphatizing, painting and other types of finishing equipment.

The ovens are designed to quickly eliminate moisture at low operating costs. The blower and heating units are in the bottom of the oven. High pressure steam and gas fired heaters (protected by safeguard controls) are available in all models. Some Ramco dryers used with gas-fired Ramco power spray washing machines have been fired completely with the exhaust products from the washing machines.

For further information, *write* Ramco Equipment Corp., a division of Randall Mfg. Co. Inc., 1379 Lafayette Ave., New York 59, N. Y.

Dip Type Washing Unit Cleans Parts, Assemblies

BATCH CLEANING of a wide variety of metal parts and assemblies can be done with an agitating, dip type washing machine, Alvey-Ferguson's Surg-a-Flow.

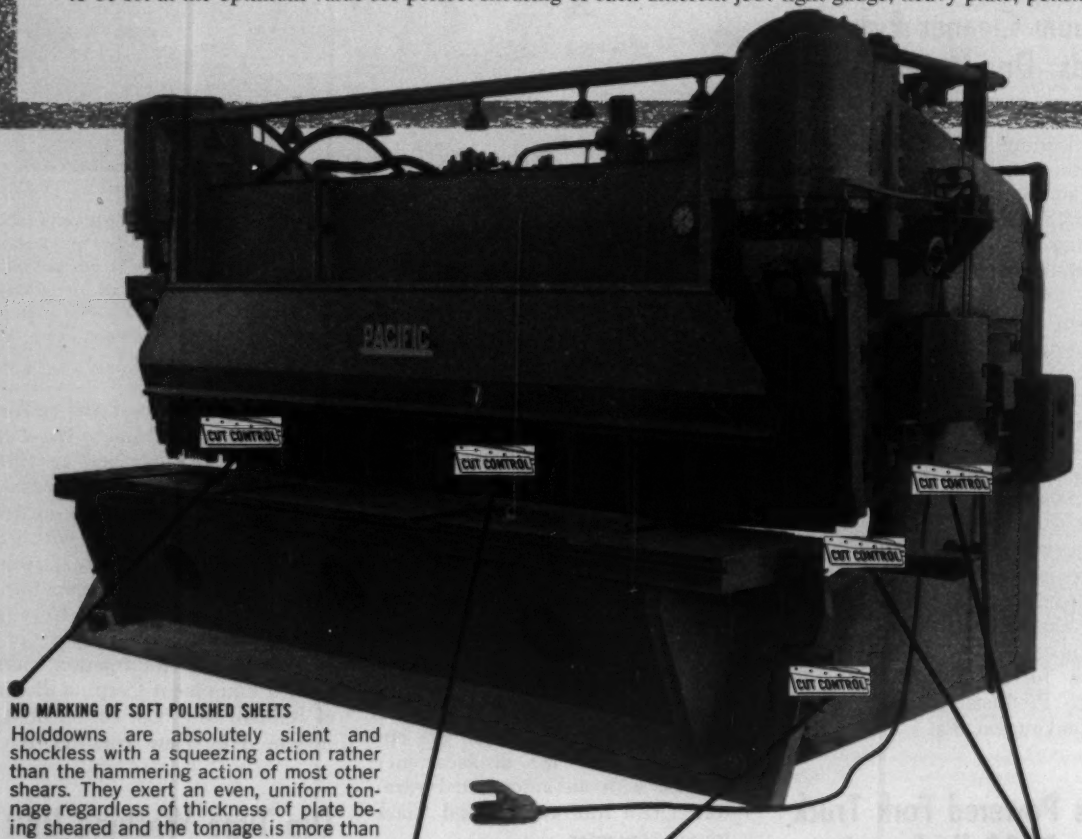
The work tray is operated by a large capacity air cylinder that has one simple control. It is a single moving assembly. No motor is required. Electrical connections are not needed (except for electrically heated solution tanks).

The machine eliminates conveying of parts to a centralized cleaning area and allows immediate rout-

(*Please turn to Page* 110)

CUT CONTROL adjustments to do jobs that

Unlike conventional shears that are limited in their shearing ability because they are permanently set without possible adjustment, PACIFIC features *Cut Control*—a group of adjustments which permit all controls to be set at the optimum value for perfect shearing of each different job: light gauge, heavy plate, polished



NO MARKING OF SOFT POLISHED SHEETS

Holddowns are absolutely silent and shockless with a squeezing action rather than the hammering action of most other shears. They exert an even, uniform tonnage regardless of thickness of plate being sheared and the tonnage is more than any other shear.

"INSURED" POSITIONING OF PLATES

For precision shearing, holddowns advance and positively grip plate independently of upper knife movement allowing operator to check for exact alignment (with aid of cut illumination) before shearing. All cuts are good cuts with PACIFIC.

LIGHT GAUGE SHEARING WITH HEAVY PLATE SHEAR

Knife clearance can quickly be adjusted over twice the range of any other shear so that PACIFIC can quickly be changed to cut either light gauge or heavy plate.

READILY SET UP FOR SLITTING

Depth of stroke readily adjusted so knives do not completely cross in slitting. This permits plates to be lined up with slitting attachment. Deep throats permit wide strips to be slit.

"CUSHIONED" SHEARING OF BRITTLE ALLOYS—Hydraulic power exerts smooth uniform shearing force cushioned against initial cutting shock and break-through shock. Rake angle readily adjusted for optimum setting to minimize or eliminate shock • HEAVIEST DUTY SHEAR—PACIFIC is designed for heavy duty continuous mill type service. It has more holddown tonnage, more horsepower and more weight in the actual stress bearing frame than any other shear. Customers report cutting full capacity stainless steel regularly • SAFEST SHEAR—Hydraulic system completely protected against deliberate or accidental overload. Shearing action can be stopped instantly in emergency by operator releasing foot pedal • LONGEST KNIFE LIFE—Customers report from 3 to 8 times longer knife life than mechanical shears. Knives cushioned against

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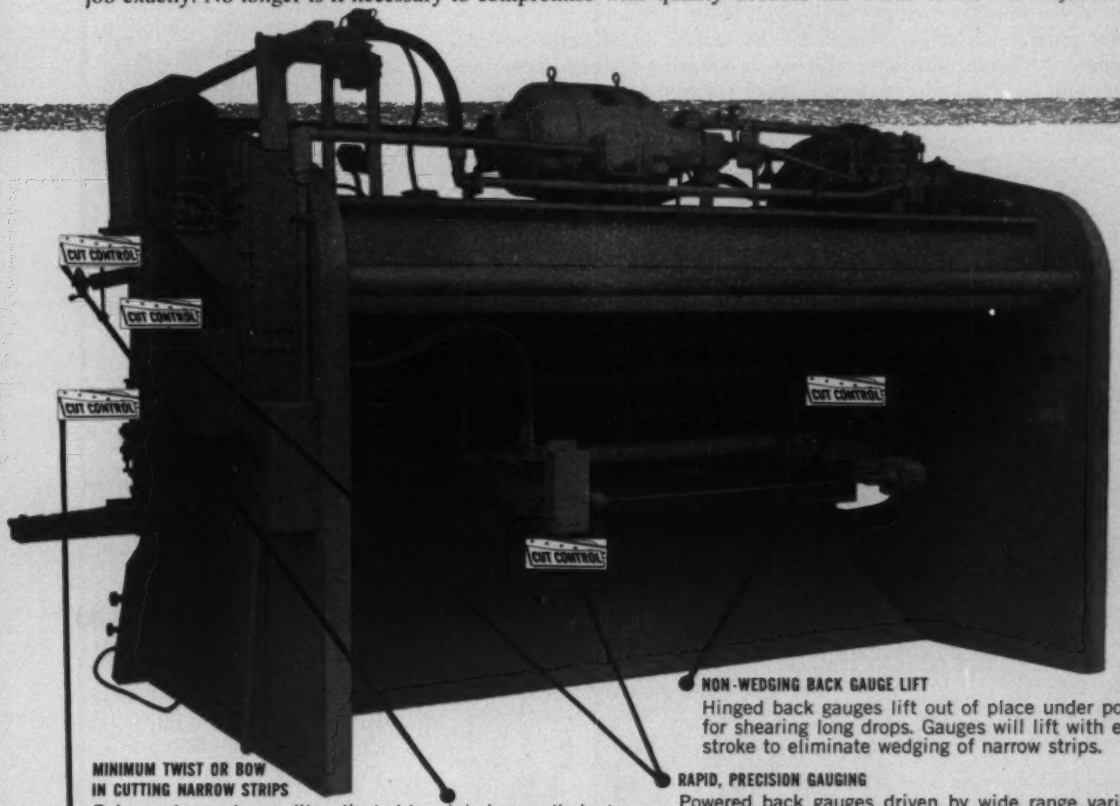
848 49th AVE., OAKLAND, CALIF. • PLANTS: OAKLAND, CALIF. and MT. CARMEL, ILL.

enable PACIFIC Hydraulic Shear are impossible on any other shear

stainless, soft aluminum, brittle alloys, long narrow strips, high speed cycling for high production, extreme accuracy for precision work, perfect mark-free edges. For the first time a shear can be controlled to fit the job exactly. No longer is it necessary to compromise with quality because the shear cannot be adjusted.



NON-WEDGING BACK GAUGE LIFT

Hinged back gauges lift out of place under power for shearing long drops. Gauges will lift with each stroke to eliminate wedging of narrow strips.

MINIMUM TWIST OR BOW IN CUTTING NARROW STRIPS

Rake angle can be readily adjusted to minimize or eliminate twist and bow in light materials. Even full capacity plate can be sheared at less rake angle than on other shears.

RAPID, PRECISION GAUGING

Powered back gauges driven by wide range variable speed hydraulic motor for rapid positioning with smooth deceleration to precise inching speed. Anti-friction ball screws; heavy single gauging bar; powered gauges controlled and indicated from front of shear.

HIGH CYCLING SPEED FOR HIGH PRODUCTION

PACIFIC has been designed to cycle as fast as an operator can feed it. Lineal speed of the ram has been selected at the optimum speed for maximum knife life and safety. Cycling speed is attained by shortening the stroke to the minimum permissible for each job thereby eliminating all wasted motion. In light gauge shearing of full length pieces, rake angle may also be reduced to further shorten the required stroke. In shearing small pieces or sheets that are less than the full length of the shear, the stroke can be shortened to the length of the sheet so that the upper knife returns upward immediately after completing the cut. Light strips can be sheared at rates up to 70 strokes per minute.

shock, protected against overload, uniform shearing speed through cut • NOISELESS OPERATION, QUIETER THAN A SEWING MACHINE—By completely eliminating usual loud, shattering noise through cushioned shockless shearing, PACIFIC has promoted measurable increase in efficiency of plant and office workers. No interference with adjacent electronic burning and gauging equipment • LOWEST MAINTENANCE—No wearing parts such as clutches, gears, bearings, brakes. All moving parts run in filtered oil. Only maintenance items are a few standard solenoids, relays, microswitches and yearly oil changes • HUNDREDS OF DOLLARS OF SAVINGS IN FOUNDATION COST—Foundation required to resist only dead weight and insure proper line-up. It need not resist heavy shocks, hammering and twisting of mechanical shear.

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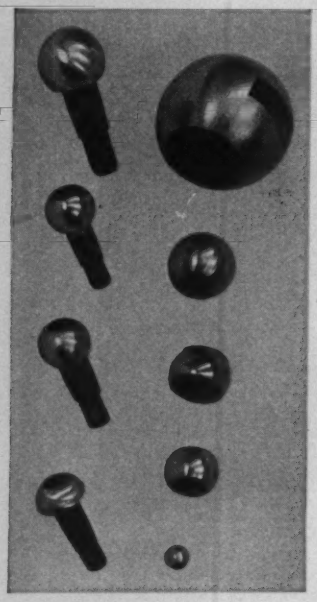
WHY PROCESSING TRUNCATED SPHERES BY MICROMATIC METHOD IS FASTER, ECONOMICAL AND MORE ACCURATE

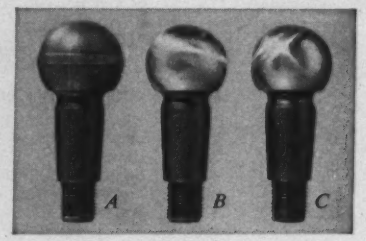
Machining of accurate truncated spheres has long been a design and production problem. The root of the problem lies in the fact that as a single point tool generates a spherical surface, the surface speed varies widely. To eliminate this problem, Micromatic has developed a fast, two-operation technique that assures uniform surface speed when machining any type of truncated sphere.



The above ball studs and other truncated spheres are typical of parts that can be processed faster, to closer tolerances and at lower cost with Micromatic machines and tooling.

First, a special cutting tool removes the bulk of excess stock from the forged part. For instance, here are the results obtained by a major automotive manufacturer: on a 1¼" diameter ball stud, approximately .060" of stock is removed from the ball in a 15-second floor-to-floor cycle. A finish of 40-60 microinches rms is obtained, total error in sphericity is held to .0005" and size is controlled within .001".

Microhoning is the second operation. In a 24-second floor-to-floor cycle, it removes final .002" of stock from the ball to generate required size, a finish of 6-10 microinches rms, sphericity within .0003" and a functional crosshatch lay pattern.

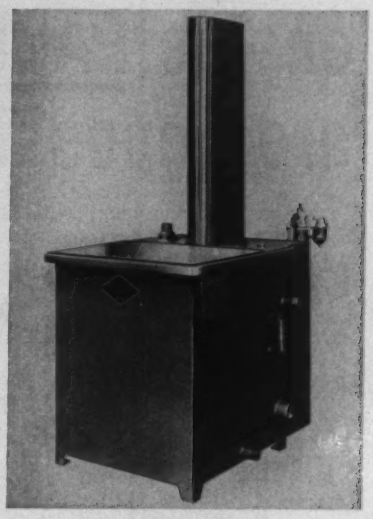


Typical ball stud processing—(A) heat-treated forging, (B) after Micromatic cutting tool operation, (C) finished ball stud after Microhoning.

See facing page for further details on how Micromatic processing of truncated spherical surfaces secures the above results.

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

NEW PRODUCTS and equipment



(*Concluded from Page* 107)

ing of cleaned parts to assembly areas or storage. A battery of machines will permit multiple stage operations involving washing, rinsing, or dunking in oil. Steam, gas, or electric heating units are available.

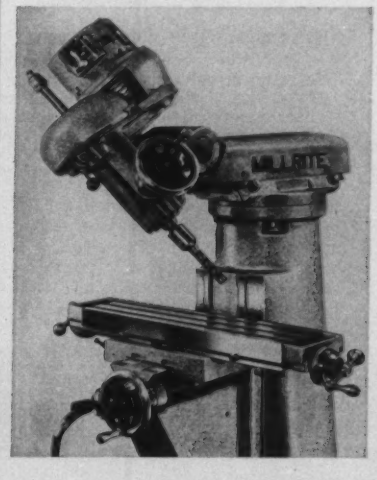
For further information, *write* Alvey-Ferguson Co., 6020 Disney St., Cincinnati 9, Ohio.

Compound Swivel Head Made for Vertical Mill

A COMPOUND swivel head designed for the U. S. Millrite vertical milling machine is being offered.

It permits double angle settings, increases range and capacity.

Recessed mounting of the swivel



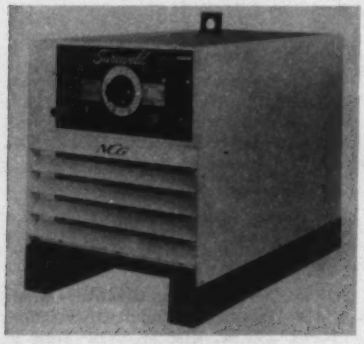
on the ram overarm minimizes overhang and maintains balance and rigidity. A protractor type scale is provided. With the compound swivel overarm, throat distance (spindle to column face) is 17 in. maximum, 6½ in. minimum. Maximum distance from the nose to the top of the 7 x 27 in. table is 18 in. Table feeds are 16 in. longitudinal and 8 in. crossfeed. Vertical knee travel is 15 in., ram movement 12 in., and quill travel 4 in.

For further information, *write* U. S.-Burke Machine Tool Div., Cincinnati Mfg. Corp., Brotherton Road at Pennsylvania R. R., Cincinnati 27, Ohio.

Arcwelders Resist Rain, Cold, Heat, Salt Spray

ARCWELDERS impervious to rain, cold, heat, and salt spray have been developed by a Chemetron Corp. division.

The transformers have double dipped Class B insulation. Other



weather resistant features include:

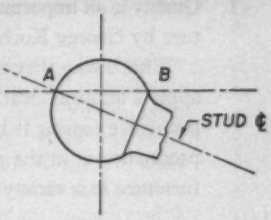
Fully sealed, semimetallic rectifiers; totally enclosed, lifetime lubricated fan motors (louver protected air intakes and exhausts); Cam-Lok output terminals; noncorrosive on-off switch contacts; and corrosion resistant, baked enamel cabinet finishes.

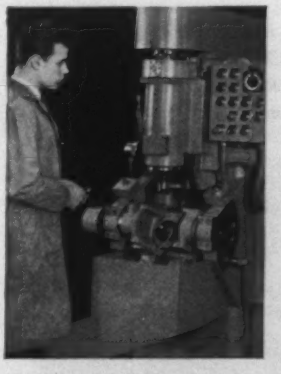
The unit has a dual current range (with a single rheostat controlling output in each range), maximum arc stability, hand or foot low voltage remote control units, and horizontal type cabinet construction to facilitate stacking of units.

For further information, *write* National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

HOW PROCESSING TRUNCATED SPHERES BY MICROMATIC METHOD ASSURES ECONOMY, SPEED AND ACCURACY

As an example, here's how Micromatic equipment in two fast operations machines 1¼" diameter forged ball studs. For both operations, the ball stud is located on the taper, clamped in the thread and positioned on an inclined axis. Thus the center of the ball crown (A) and the intersecting point of sphere and shoulder (B) are in a horizontal plane.

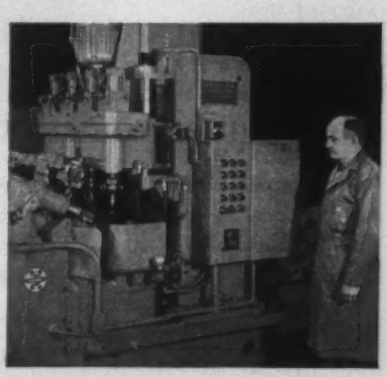




FIRST OPERATION: *Cutting excess stock from forged ball stud.*

The first machining of ball stud is a cutting operation. A special Micromatic cutting tool, that is U-shaped at the cutting end, is used to assure constant cutting speed over every point of the ball. Two round carboloy blades are clamped in the tool—clamp also acts as a chip breaker. With blades positioned in a counterbore, no adjustments are required. Size is controlled within .001" by depth of feed, set by an adjustable stop. Blades may be turned or reversed to give several usable cutting faces. Also, since they are throw-aways, these blades offer additional economies. Approximately 2,000 balls are machined with each set of blades. In a 15-second floor-to-floor cycle, the cutting operation is completed—total error in sphericity is held to .0005".

The ball is then Microhoned. The combination or rotating motions of workpiece and the special Microhoning tool results in a functional cross-hatch lay pattern and makes the abrasive self-dressing. In a 24-second floor-to-floor cycle, Microhoning generates required size, sphericity within .0003" and a finish of 6-10 microinches rms.



SECOND OPERATION: *Microhoning ball stud to secure final size, sphericity and finish. Single spindle machines also available.*

For Further Information, Write To:

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

RANSBURG

What Would Paint Savings Like This* Mean in YOUR Finishing Department?

Quality is all important in the production of fine Metalcraft furniture by George Koch Sons, Inc., Evansville, Indiana.

That's why they use the Ransburg Electrostatic Hand Gun to apply a uniform clear coating on their brass-plated furniture. The protective coating is baked on. Although the bulk of their present production is in the popular brass line, they still paint the metal furniture in a variety of colors with the Hand Gun.

Painting is CLEANER ... QUICKER ... CHEAPER *with the Ransburg Electrostatic Hand Gun.*

These chairs and table are typical of the Koch line of metal furniture.

*10 GALLONS OF PAINT NOW DOES THE JOB WHICH FORMERLY TOOK 30 GALLONS

On one item—a TV table—they formerly used 30 gallons of enamel to coat 1000 units by combination dip and air spray method. Now—with the Ransburg Electrostatic Hand Gun, they paint 1000 tables with only 10 gallons. And, they get a better, more uniform coating, too.

NO REASON WHY YOU CAN'T DO IT, TOO!

See how the Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

NEW literature

Write directly to the company for a copy

Systems Catalog

"New Color Horizons," 38 pages, covers protective coatings for rust and corrosion control. Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill.

Beryllium Oxide Crucibles

Details on beryllium oxide crucibles used in melting ultrahigh purity or reactive metals are discussed in a tech sheet. Included are specifications of 31 standard sizes. Beryllium Corp., P. O. Box 1462, Reading, Pa.

Thermal Insulation Data

Thermal insulations for all types of commercial and industrial requirements, in applications ranging from −400 to 3000° F are described in a catalog, IN-244A. Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.

Crusilite Brochure

Technical data are given on Crusilite, a new type of silicon carbide, electric furnace heating element. Crusilite Dept., Morganite Inc., 3302-3320 48th Ave., Long Island City 1, N. Y.

Riveting Aluminum

A 52 page book covers use of conventional and special rivets and explains design and fabrication of riveted joints. Dept. PRD-23, Reynolds Metals Co., Richmond 18, Va.

NEW BOOKS

How to Increase Your Creative Output, Book Department, Industrial Relations News, 230 W. 41st St., New York 36, N. Y. $1.50

This booklet was developed to help companies raise the level of creativity among their technical personnel. It provides practical guideposts for understanding the creative process and for increasing quantity and quality of creative work. The booklet gives the dos and don'ts of defining a problem and tells how to get underway in solving a creative problem.

Effective Marketing Action, American Marketing Association, Harper & Bros., 49 E. 33rd St., New York 16, N. Y. 340 pages, $6

The latest thinking on how business can efficiently organize its marketing efforts has been recorded by 39 leading executives and academicians. Some of the subjects include better management through planning, development of marketing concepts, communications with salesmen, selling marketing ideas, and increasing the effectiveness of advertising. The book was sponsored by the New York Chapter of the American Marketing Association.

January Output May Break Record

MONTHLY STEEL INGOT PRODUCTION may pass the 12 million ton mark by the end of January for the first time in history. December's output of 11.9 million tons narrowly missed the mark but still eclipse the previous record (last May's 11.6 million) by a wide margin.

Last week, steelmakers operated their furnaces at 95.5 per cent of capacity, 0.2 point above the previous week's revised rate. Production was about 2,721,000 ingot tons.

NO SHIPPING RECORD—Although they're making every effort to ship at the maximum rate this month, steelmakers won't be able to match their June, 1959, performance. Reason: In that month, they swept their walls clean in anticipation of the strike, shipping odds and ends that had been produced in previous months. Their shipments (9.7 million tons of finished steel) were equivalent to 110 per cent of capacity.

FEW CANCELLATIONS—The pressure for rush shipments is off as a result of the labor settlement; but steelmakers have had no sizable cancellations that can be attributed to a change in buyers' psychology. Scattered requests for delayed shipment or for a stretchout of orders previously entered are indicative of the more relaxed attitude that has been prevalent since the strike threat ended. Although they foresee continued strong demand for many products in the second quarter, sales executives don't expect their forward order books to be as fully specified as they were when users feared resumption of the strike.

BUYERS MORE PARTICULAR—At Chicago, some consumers are reacting to the steel labor settlement by firming up their future requirements and telling mills that tonnage previously requested on a tentative basis is definitely needed. Buyers want exactly the products they specified in their orders. Heretofore, they would have accepted substitutes out of fear that another strike might catch them short of stock. Now a brief wait doesn't seem too perilous.

AMPLE CAPACITY—Because they're not having much success at rebuilding their inventories overnight, some steel users imagine that the industry's capacity isn't adequate for peak demand conditions. The truth is that there's ample capacity for every product. Galvanized sheets are tight because of a special situation: Fabricators are trying to replace abnormally low inventories in the face of rising demand from automakers. Even so, the market will loosen after midyear. Producers could ship more than 4 million tons this year if they were pressed, and that's more than will be consumed. Tin plate capacity of 8 million tons exceeds this year's expected consumption by 1 million.

ENOUGH IS ENOUGH—After the 1956 steel strike, consumers started to rebuild their depleted inventories to a "normal" level (20 million tons), but they didn't stop when they got there. Even though they were assured of uninterrupted supplies for at least three years, they boosted their stocks to 25 million tons—a size that invited liquidation. Result: A drastic cutback that started in July, 1957, and lasted for a year. Steelmakers hope it won't happen again. If the price of a 135 million ingot ton year in 1960 is a drop to 95 million next year, they would rather settle for 125 million now and 105 million in 1961.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the Jan. 11 issue and will appear in subsequent issues.

Hydrometals' Zeder believes new alloy means . . .

More Zip for Zinc

IF YOU have any doubts about the '60s being fiercely competitive for metalworking, take a look at what's happening in zinc.

An alloy that combines zinc with small quantities of copper and titanium has some metalmen so excited they're talking of tackling aluminum, copper, brass, and stainless steel head on in areas where zinc never had a market before.

Part of the enthusiasm may be due to the fact that remarkable technological developments and market penetrations for zinc have been few in recent years, although demand for zinc consistently runs behind only three other metals (steel, aluminum, and copper).

• **Lineup**—New Jersey Zinc Co., New York, is extensively testing the new alloy and has announced it will license interested companies to produce it.

Matthiessen & Hegeler Zinc Co., La Salle, Ill., is producing small amounts of sheets, strip, rods, and wire (under license from New Jersey Zinc) for test purposes. It plans eventual commercial output.

The most enthusiastic drumbeater for the zinc-copper-titanium product is Hydrometals Inc., New York, which is marketing the alloy under the tradename Hydro-T-Metal. It contains 0.5 per cent copper, 0.1 per cent titanium, and minute quantities of two other metals; the remainder is special high grade zinc, says Fred M. Zeder II, Hydrometals president.

• **Not Just Another Alloy**—"T-Metal" is much more than just another alloy of zinc, says Mr. Zeder. His claim: "An entirely new and unique material that looks better, acts better, lasts longer, and costs less than other metals in a bewildering variety of applications."

"T-Metal" is said to be 40 per cent stronger than plain zinc and 350 per cent more resistant to stress. Perhaps one of the biggest advantages claimed for the alloy is creep resistance, long the zinc bugaboo.

Other advantages claimed by Mr. Zeder:

- Can be deep drawn without stopping for stage annealing.
- Solders easily and can be fusion welded.
- Can be spun, extruded, stamped, coined, embossed, perforated; self-lubricating for purposes of roll forming; takes nickel and chrome plating; can be subjected to high temperature processing (up to 500° F).
- Easy on tools and dies.
- Nonsparking, nonmagnetic, has about the same conductivity as brass.
- Corrosion resistant even in coastal or industrial atmospheres; can be embedded in concrete and mortar without protective coating; won't stain or discolor surrounding materials.
- Can be coated in almost any color.

• **Targets**—Biggest uses right now are in building products (flashing, gutters, downspouts) and in zippers. There's a heavy potential in such areas as tubing, hose connections, containers, window frames, bar stock, and numerous other products (see picture), believes Mr. Zeder. The big push will be to open the auto market in such areas as stampings, sockets, gaskets, electrical terminals, chrome plated parts and drawn parts (107 areas of application have been tested).

That will put the alloy in direct competition with copper, brass, and stainless steel. If this awes the Hydrometals planners, they're keeping it well hidden. With a marketing concept much more closely allied to aluminum than zinc and with a promotion kitty of over $250,000 to announce the alloy alone, they plan to publicize the claims that "T-Metal" (with a density of 0.258 lb per cu in.) will cover 20 per cent more area than copper, 16 per cent more than brass, and 9 per cent more than stainless steel; and that it undersells hot rolled copper by 48 per cent, rolled brass by 40 per cent, and stainless steel by 57 per cent. "T-Metal" scrap can be recovered and sold at about 70 per cent of the price of slab zinc, says Mr. Zeder.

The long range target will be direct competition with aluminum, he explains. That will become possible when large tonnage production allows "T-Metal" prices to be significantly lowered.

• **Forms**—Currently, "T-Metal" is being rolled in widths from 0.25 to 80 in. in thicknesses ranging from

0.004 to 0.125 in. (even beyond for heavy plate stock) and in coil sizes up to 175 lb per inch of width.

• **1960 Goal**—This year, Mr. Zeder forecasts that 32 million lb of "T-Metal" will be sold. Partial breakdown: 4 million lb as a substitute for rolled copper in the building industry (16 per cent of the market), 6 million lb to present users of rolled brass (1 per cent of the market), 7.450 million lb to builders now using aluminum (0.5 per cent of the market), 2.550 million lb to present users of stainless steel (1 per cent of the market).

Without expanding production facilities, Hydrometals can turn out 500 million lb of "T-Metal" yearly, says Mr. Zeder.

• **Three Company Tieup**—Production of "T-Metal" involved a three company tieup. Hydrometals and American Zinc, Lead & Smelting Co., St. Louis, will jointly mine and process material from Hydrometals' western properties. American Zinc will then cast 8000 lb ingots (by a semicontinuous casting process) and ship them to the Madison, Ill., plant of Dow Metal Products Co., a division of Dow Chemical Co., for rolling and extruding on a toll basis for Hydrometals.

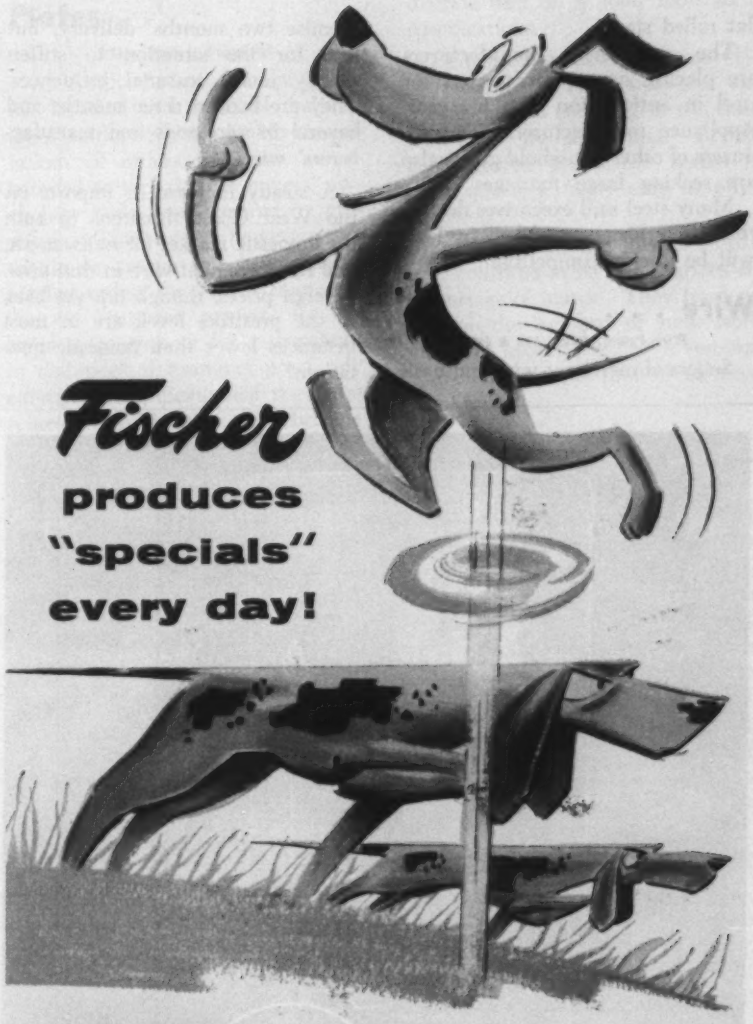
Sheets, Strip . . .

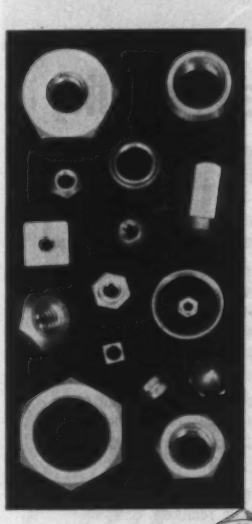
Sheet & Strip Prices, Pages 121 & 122

Not the slightest easing in demand for sheets is noted. Mills find it will be necessary to continue allocating all types. Some producers have not formally entered second quarter orders, but commitments to regular customers on a normal buying pattern assures full operations for the first half of the year. Spot gaps may appear from time to time as consumers adjust schedules and possibly cancel some duplicate orders, but they will be quickly filled.

The situation in enameling stock and electrical sheets is not as strong as in the major tonnage items, but producers of those grades and certain other specialties anticipate excellent business.

Manufacturers of stoves, furniture, and containers in the East are particularly active. Even though this is an off season, domestic storage tank fabricators are pressing for





AS SPECIALISTS IN PRECISION NUTS . . . both brass and aluminum . . . we can help resolve your fastening or assembly problems by supplying *uniformly accurate turned nuts to your exact specifications.* To date, we have furnished more than 3,457 different types of special or odd size nuts, including miniatures, to customers making widely diversified products. Their satisfaction with our over-all performance is eloquently confirmed by repeat orders . . . plus orders for new items!

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flat rolled steel.

The automotive manufacturers are placing near record orders for steel in anticipation of a big year. Appliance manufacturers and producers of other household goods also are seeking large tonnages.

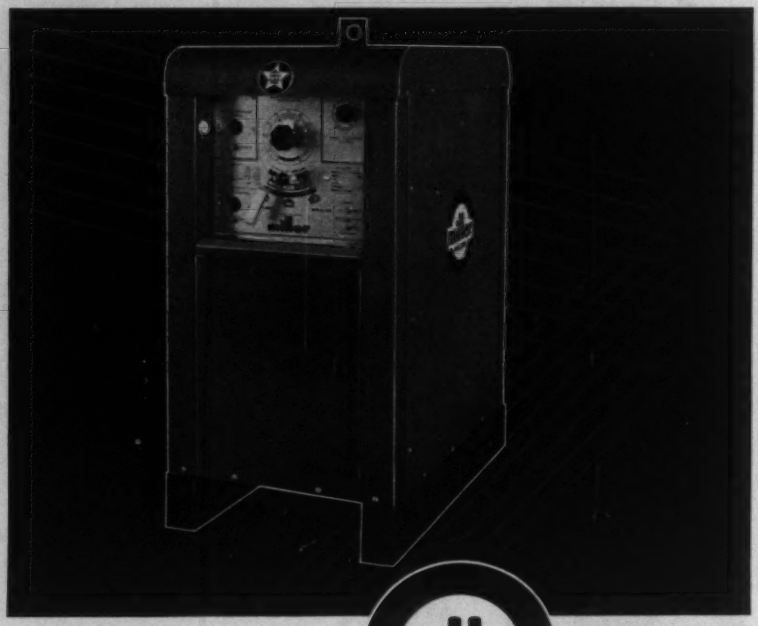
Many steel mill executives declare that their biggest problem in 1960 will be foreign competition.

Wire . . .

Wire Prices, Pages 122 & 123

Sellers of merchant wire and nails promise two months' delivery, but look for the situation to stiffen shortly under seasonal influences. They are booked three months and beyond in wire rods and manufacturers' wire.

A steady increase in imports on the West Coast threatens to ruin the domestic market for nails, mesh, and reinforcement wire in that area. Foreign prices, though not yet back to the prestrike level, are in most instances lower than domestic quotations.



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. . . . becomes evident after sufficient exposure to the original cost/maintenance costs/production/profits equation.

Exploiting the full potential of better basic design, the Miller Gold Star 300 series ac-dc welders convert in minutes from the prime ac-dc welder of exceptional performance to any of these three A-C applications: Metallic Arc, manual or automatic Inert Gas; or, to any of the following D-C applications: Metallic Arc, manual or automatic Inert Gas, or Inert Gas spot welding.

It's important to note that the Miller conversion kits utilized to obtain any of the above simply extend the built-in superiority of the 300 series' welding characteristics into the type of application desired. It's adaptable by design — not discovery.

Available in 200, 300, 400 and 600 ampere models, all feature the exclusive Miller transformers and semi-metallic rectifiers. Complete specifications, including duty cycle chart, will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

Steel Bars . . .

Bar Prices, Page 120

Hot rolled bar producers have received no cancellations or instructions from customers to hold back shipments in the wake of the steel labor settlement. Users apparently need all the bars they can get for immediate consumption. Since their inventories are far below the level needed to support current operations, they'll concentrate on rebuilding stocks to workable size before giving any thoughts to cutbacks.

Sales executives are under pressure from customers who want tonnages shipped early in the second quarter. One large producer says he is behind fully a month on his current promises; another says he has little to offer for shipment before late May.

Hot alloy bars can be had in late March and April, except where they have to be heat treated. In that case, some deliveries run into May. Cold drawn alloy bar shipments fall well into the second quarter where processors have no hot stock on hand. Cold rolled carbon shipments also are well extended under such circumstances.

Producers anticipate some falling off in demand during May and June, although they still look for an active first half. Prior to the wage settlement, bar suppliers figured they wouldn't catch up with their back orders until midyear. Now, with the possibility of stretchouts in the second quarter, chances are good that operations will be current by late April or May.

Even though the steel settlement quieted fears of another work stoppage, cold finishers believe their order books are secure, particularly on material scheduled for rolling in the next few weeks. Automotive suppliers and other big customers are expected to take all the tonnage they can get because their inventories are below desired working levels. One automotive partmaker doubled his March order after the steel settlement was announced, demonstrating that boom forecasts for car assemblies carried more weight than assurances that steel would flow uninterruptedly.

The Springfield, Mass., armory is closing Jan. 19 on 465 tons of bars,

including 384 tons of 1 23/32 in. alloy squares.

Pacific Tube Co.'s additional bar mill facilities at Los Angeles will release initial tonnages of shapes and turned bars early this year. The product line has been broadened from bars only to include square, hexagon, and turned and polished bars. A wide range of analyses will be available in the following sizes: Rounds, 3/16 through 4½ in.; squares and hexagons, ¼ through 2½ in.; cold drawn shafting, ¼ through 2 3/16 in.; and turned shafting 1 through 4½ in.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

End of the labor controversy has prompted mill operators to analyze costs under the new agreement. Operations of reinforcing bar mills continue at high levels and efforts are being made to expedite deliveries and clean up commitments which were relayed during the shutdown last year.

Supply of concrete reinforcing bars is best of all construction steel. In some areas, especially in the South and Southwest, this is due to heavy imports during the last few months.

About 5000 tons of reinforcing bars, involved chiefly in state highway projects, are pending in the Pacific Northwest and will be placed soon. For completion of the Mayfield Dam, Tacoma, Wash., 10,000 tons of bars will be required. The general contract is pending.

Imported Steel . . .

Imported Steel Prices, Page 126

A mill spokesman in the Southwest says the labor settlement will handicap producers in their fight against imported steel. Import brokers in the Houston area are expected to begin price cutting on stockpiled material.

A consumer reports purchase of a tonnage of 2 by 2½ in. angles, which were en route when the controversy ended, for 6.00c a pound, f.o.b. truck, Houston.

Prices are holding unchanged at the foreign mill level and are expected to remain stable. If U. S. mill prices rise materially, increased buying of imported products likely will develop.

Plates . . .

Plate Prices, Page 120

Although the pressure for plates has lessened as a result of the steel labor settlement, no sizable cancellations of orders that can be attributed to a change in buyers' psychology have been received by producers. They notice, however, that customers are far less interested in placing orders for March than previously. Scattered requests for delayed shipments, or for a stretchout in deliveries of tonnages previously entered, are indicative of the more relaxed attitude that has become prevalent since the strike threat vanished.

Some mills are booked solidly through April and into May. Bookings are especially large for the heavier gages of sheared plates. At least two mills have small tonnages left for March, but this is due to limited allotments rather than to inability to enter more tonnage. One seller explains that he can book all the tonnage he can handle during the first half and that much is to be gained by keeping commitments in close balance with production and on a solid basis as to specifications.

Demand for heavy plates (1½ in. and over) for condensers and pressure tanks is strong in the East. Deliveries are tightening. Special heat treated plates are scarce in some quarters, fairly easy in other quarters.

Fabricators in the Pacific Northwest continue to be handicapped by a shortage of plates. They have restricted the amount of new work they will accept pending a resumption of the normal flow of material from mills.

Structural Shapes . . .

Structural Shape Prices, Page 120

Structural steel demand is improving, mainly as a result of the new labor peace, assuring a steady flow of plain material. Part of the improvement is attributed to seasonal factors. Demand for bridges and other highway requirements continues outstanding.

Elimination of the threat of another shutdown of mills has eased the pressure for immediate shipments. Most of producers' ship-

.0005 to .125

In the 200, 300, and 400 series of Stainless Steel Strip plus Inconel, Inconel "X", A286, L605, 17-7 P.H. and many other super alloys in stock — supplied in two weeks or made to order in three weeks.

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ments are on schedule.

Competition among fabricators is strong despite fairly comfortable backlogs and difficulties in rounding out plain material stocks. Wide flange sections remain especially scarce with delivery promises ranging up to 21 weeks. Standard shapes can be had within 12 weeks.

The uncertain price situation makes estimating on fabricated structural tonnage difficult. Most steel suppliers and contractors favor escalator clauses in their contracts, but competition operates against this.

While limited quantities of structurals are being received by fabricators on the West Coast, many inventory gaps probably will not be filled for another 90 days or so. Buyers are pressing the mills for prompt deliveries.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4000 tons, bridge superstructure, Route 495, Merrimack River, Lawrence, Mass., to Harris Structural Steel Co., New York; bids direct, including erecting and fabricating, Jan. 5, Boston.

2700 tons, power unit No. 3, Carbo, Va., through American Electric Power Service Corp., to Apollo Steel Industries, Apollo, Pa.

640 tons, boiler supports, Combustion Engineering Co., Los Alamitos, Calif., to Kaiser Steel Corp., Fontana, Calif.

415 tons, manufacturing plant, Tempax Co., Rutland, Vt., to Vermont Structural Steel Co., Burlington, Vt.

330 tons, Latin Casino Night Club, Delaware Township, New Jersey, to Frank M. Weaver Co., Lansdale, Pa.

350 tons, including reinforcing bars, high school, Medfield, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., (structurals) and Northern Steel Inc., Boston, (reinforcing bars); L. & R. Construction Co., North Reading, Mass., general contractor.

270 tons, building, Singer Sewing Machine Co., Syosset, N. Y., to Standard Structural Steel Co., Hartford, Conn.

267 tons, Rhinelander Boys' Club, 88th Street, New York, through W. J. Barney, general contractor, to White Plains Iron Works, Peekskill, N. Y.

180 tons, state bridge work, Montgomery County, N. Y., through D. A. Collins, Mechanicsville, N. Y., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

173 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Flanders Steel & Pipe Corp., Westbury, N. Y.

170 tons, administration building, Reading School District, Reading, Pa., to Reading Steel Products Co., that city.

160 tons, shopping center stores, Sears, Roebuck & Co., Saugus, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Vappi & Co. Inc., Cambridge, Mass., general contractor.

120 tons, state bridge work, New Castle County, Delaware, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

12,775 tons, state highway work, Gowanus Expressway, Kings County, N. Y.; bids Jan. 28.

6000 tons (estimated), reconstruction of upper roadway, Manhattan Bridge, New York; Karl Koch Erecting Co. Inc., Bronx, N. Y., low on general contract with a bid of $6,337,000.

5000 tons or more, main span and superstructure, Port Mann bridge, Fraser River, British Columbia; bids to minister of highways, Victoria, B. C., Feb. 3.

3640 tons, courthouse and federal office building, Brooklyn, N. Y.; J. P. Carlin and Atlas Tile & Marble Co., New York, low joint bidders on general contract.

3000 tons or more, three Titan missile launching facilities near Mountain Home, Idaho, Air Base; bids to U. S. engineer, Walla Walla, Wash., Feb. 5.

1800 tons, Washington state Biggs Rapids, Columbia River, bridge; bids to Olympia, Feb. 9.

1420 tons, state highway work, New York County, N. Y.; bids Jan. 28.

750 tons, mental institution, State Department of Public Works, West Seneca, N. Y.; J. W. Copper, low on general contract.

110 tons, two New York Central bridges, Mitchell, Ill.

110 tons, addition to administration building, New Jersey Turnpike Authority, New Brunswick, N. J., pending.

100 tons, overpass, Maine Central Railroad, Rumford, Maine; state project.

100 tons or more, Air Force buildings, Northeast Cape, St. Lawrence Island, Alaska; general contract to Morrison-Knudsen Co., Seattle.

Unstated, steel government-furnished; Alaska radar towers, low bids: Bethel Air Station, Alcan-Pacific Co., Anchorage, Alaska, $150,425; Campain Air Station, Fairbanks Builders Inc., Fairbanks, Alaska, $136,300.

Unstated, operations and recreation buildings and utilities, St. Lawrence Island, Alaska; Morrison-Knudsen Co., Seattle, low at $968,000 to the U. S. Engineer.

Unstated, plant addition, also air conditioning system; bids to Glacier Sand & Gravel Co., Seattle, Jan. 14.

Unstated, steel frame Safeway Distribution Center and office, Bellevue, Wash.; bids in Jan. 6.

Unstated, building addition and alterations, Hanford Works; general contract to W. G. Clark Construction Co., Seattle, $406,000, by the Atomic Energy Commission.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, shopping center stores, Sears, Roebuck & Co., Saugus, Mass., to Northern Steel Inc., Boston; Vappi & Co. Inc., Cambridge, Mass., general contractor.

150 tons, baseball stadium and apartment house, Tacoma, Wash., to J. D. English Steel Co., Tacoma.

118 tons, dormitory, State Teachers' College, Bridgewater, Mass., to Northern Steel Inc., Boston; G. L. Rugo & Sons Inc., Boston, general contractor.

REINFORCING BARS PENDING

14,000 tons (estimated), three Titan missile launching facilities near Mountain Home, Idaho, Air Base; bids to U. S. engineer, Walla Walla, Wash., Feb. 5.

10,000 tons, completion of Tacoma, Wash., Mayfield power project; Perini Corp., Framingham, Mass., apparently low at $10,016,440, and alternatives.

450 tons, Washington state Biggs Rapids, Columbia River, bridge; bids to Olympia, Feb. 9.

230 tons, Washington state, four highway bridges, King County; bids to Olympia, Jan. 26.

PLATES . . .

PLATES PENDING

100 tons, elevated steel water tanks, Chicago Bridge & Iron Co., Seattle, low to Edmonds, Wash.

PIPE . . .

CAST IRON PIPE PLACED

165 tons, 4 and 6 in. cast iron pipe for Bellingham, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

38 tons, 6 in., for Shelton, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago & North Western, 116 double deck commuter coaches, to Pullman-Standard Div., Pullman Inc., East Chicago, Ind.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Jan. 17	Change	Same Week 1959	Same Week 1958
Pittsburgh	97.5	— 0.5*	77	57
Chicago	95.5	+ 0.5*	81	62
Eastern	95.5	— 1.5	75	76
Youngstown	99	0	64	55
Wheeling	95	+ 1	84	56
Cleveland	98.5	+ 1*	83.5	46
Buffalo	104.5	— 3	63.5	53.5
Birmingham	93.5	0	70.5	58
Cincinnati	98.5	— 2*	85	62.5
St. Louis	99	+ 7.5*	89.5	62.5
Detroit	102	— 2*	94.5	56.5
Western	92	+ 2	74	79
National Rate	95.5	+ 0.2*	74.6	57

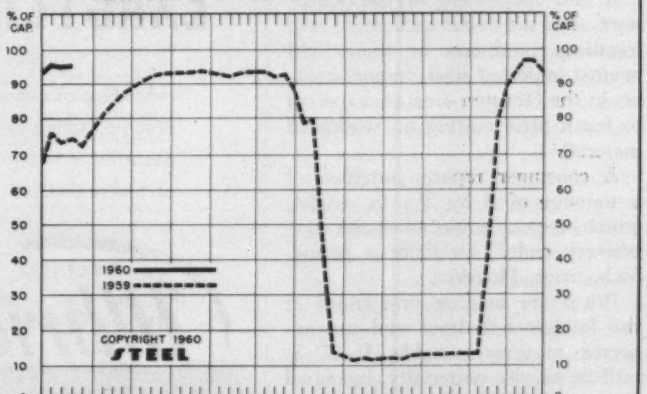
INGOT PRODUCTION

	Week Ended Jan. 17	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	169.4†	169.0	169.7	131.4
NET TONS (In thousands)	2,721†	2,715	2,726	2,111

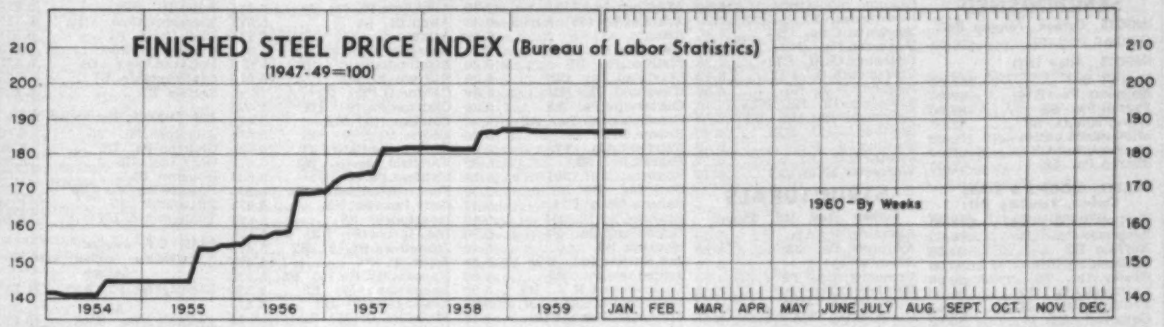
*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,849,474 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Jan. 12, 1960	Week Ago	Month Ago	Dec. Index	Year Ago
186.8	186.8	186.8	186.8	186.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 12

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.758
		Woven Wire Fence (20-rod roll)	21.793

STEEL's FINISHED PRICE INDEX*

	Jan. 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.67	41.33	41.33	40.33	35.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	Jan. 13 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$42.50	$41.50	$41.50	$42.50	$36.50
No. 1 Heavy Melt, E. Pa.	42.00	42.00	42.00	36.00	33.50
No. 1 Heavy Melt, Chicago	40.50	40.50	40.50	42.50	35.00
No. 1 Heavy Melt, Valley	44.50	44.50	43.50	43.50	36.50
No. 1 Heavy Melt, Cleve.	41.50	41.50	40.50	39.50	33.50
No. 1 Heavy Melt, Buffalo	37.50	37.50	37.50	35.50	30.50
Rails, Rerolling, Chicago	62.50	61.50	61.50	62.50	53.00
No. 1 Cast, Chicago	54.50	54.50	54.50	46.50	40.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Jan. 13, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 121; footnotes, page 123.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ...109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flanges

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 .....13.55

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont, Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES

Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLE; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S37 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S37 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 ....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. B2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt, Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alley

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 ....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ...6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 ..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ....6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling Iron

Ashland Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles O. M21, S3 ....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 ....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union CarbideMetalsCo.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
San Francisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††	
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.75
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7,J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga. Iper 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.06
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190‡
Atlanta A11	198‡
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‡
Atlanta A11	192‡
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'im'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.San.Fran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage) An'd Galv.

Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325‡
Atlanta(48)A11	9.10 9.775‡
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675‡
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625‡
Monessen(48) P7	8.65 9.35‡
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775‡
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: *13.50, †5c, ‡10c. ‡‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American **Standard:** Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS Filister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam, 6 in. and shorter:

Packages	+ 5
Bulk	+19

Through 1 in. diam., longer than 6 in.:

Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Pueblo,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Toe Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.05c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+8.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+6.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	43.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
306	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

Stainless	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.65	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb pigiets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[2]		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	11.25	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.63
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.35[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.54	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; ‖2 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]⅝-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [9]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of 8lb content, c.i.f. seaboard

50-55%	*$2.50-2.75*
60-65%	*2.80-3.20*

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.i. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.70-52.20†
Bronze, 5000-lb lots	53.50-57.50†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, E'ectrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	54.00-58.30†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-55.00
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	20.70-33.90‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr, min, metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, oven	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.75	....	$6.70	$6.60	$7.06
Bar Size Angles	6.45	....	6.40	6.30	6.76
Structural Angles	6.35	....	6.30	6.20	6.66
I-Beams	6.35	....	6.30	6.20	6.66
Channels	6.35	....	6.30	6.20	6.66
Plates (basic bessemer)	6.60	....	6.65	6.55	6.95
Sheets, H.R.	9.50	....	9.45	9.35	9.75
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	11.00	....	10.95	10.85	11.25
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	11.00	....	10.95	10.81	11.25
Sheets, C.R. (drawing quality)	12.00	....	11.95	11.85	12.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.00	....	25.74	25.50	27.12
Barbed Wire (†)	8.25	....	8.20	8.10	8.50
Merchant Bars	6.45	....	6.40	6.30	6.76
Hot-Rolled Bands	9.50	....	9.45	9.35	9.75
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (‡)	8.25	....	8.20	8.10	8.50

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome (C 5-8%, Si 4-7%): No. 1 (53-55% Cr) 25.00c; No. 2 (61-65% Cr) 26.00c.

Blocking Chrome (C 6% max., Si 8-12%): No. 1 (50-55% Cr) 26.00c; No. 2 (58-63% Cr) 27.00c.

Refined Charge Chrome (C 5% max., Si 2.5% max.): No. 1 (50-55% Cr) 27.50c; No. 2 (58-64% Cr) 28.50c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lots 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c; 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Rises on Light Sales

Advance of 34 cents to $41.67 in STEEL's composite price for No. 1 heavy melting is first change since Dec. 9. Suppliers expect heavier demand to develop soon

Scrap Prices, Page 130

● **Pittsburgh**—The market is firm but inactive in the wake of recent mill purchases. A leading consumer bought No. 1 heavy melting scrap at $43 (up $1), No. 2 heavy melting at $37 (unchanged), and No. 2 bundles at $32 (up $1). Prices paid for scrap on the Pennsylvania Railroad list were mixed, with some grades up as much as $2 and others unchanged.

Sellers base their hopes for higher prices on the assumption that the continued high level of ingot production will force several mills into the market at once. Since steelmakers have plenty of scrap, it's unlikely that they'll buy enough to push prices much above the current levels. The peak may come next month.

● **Chicago**—Steel mills in this area are not buying scrap. Result: Prices are essentially unchanged. Lack of activity is an offsetting influence to bullishness which scrap dealers displayed following announcement of the steel labor contract.

Chicago steelmaking operations are at 95.5 per cent of capacity, and a rate at least that high appears assured in the weeks ahead. However, mills are well supplied with raw materials and, furthermore, they are relying heavily on blast furnace hot metal. Active blast furnaces total 39 out of 43.

● **Philadelphia**—While there is no real weakness in scrap, some minor downward adjustments in prices have been made. No. 2 heavy melting steel eased to $37-$38, delivered, on a small tonnage placed recently at the inside figure. Shovel turnings are off slightly to $26-$27. A temporary spread is quoted on heavy turnings at $31-$35, the lower figure representing a small purchase for open hearth consumption and the higher figure representing some light buying for electric furnace requirements.

All other steelmaking grades are unchanged. Mills are buying only small tonnages, but exporters are ordering fairly freely. At least three cargoes will move from this port before the end of the month. Bulk of these exporters is going to Japan.

No. 1 cupola cast is moving at $43, delivered, a decline of $2 a ton from the previous quoted level.

● **New York**—Scrap brokers' buying prices are unchanged here. Substantial export demand continues to offset dullness in the domestic market.

● **Detroit**—A strong undertone still prevails in the scrap market here. Prices on No. 1 grades and turnings are up $1.

No local orders are out, but a Canadian order for No. 1 bundles is reported at $40. The Canadians also are taking some busheling.

Dealers believe one reason their market isn't stronger is that January industrial lists were underestimated and the auto plants will be selling surplus scrap during the month.

● **Buffalo**—A leading mill here has tendered its scrap orders for the remainder of January. Originally, January orders were scheduled to run only until midmonth when mills anticipated starting preparations for another shutdown.

Dealers report that mills extended orders on No. 2 bundles for the balance of the month at the same price. The feeling in the Buffalo trade is that prices will hold around current levels for the remainder of January, possibly edging up a bit when February mill buying begins.

● **Youngstown**—A major steel producer here purchased No. 2 bundles at $29, delivered. It was one of the few purchases of that grade in this district in the last three years. Mills have made no purchases of other grades recently despite the prospects for continued high steelmaking operations.

● **St. Louis**—Activity in the scrap market is dull. Dealers are hanging onto material in expectation of higher prices, while mills are cautious in placing buying orders so as not to start a price spiral now. The market is expected to advance eventually since high steelmaking operations will force operators to reach for more scrap.

● **Birmingham** — Scrap movement continues slow, but there seems an underlying strength, with no one attempting to lower prices. A railroad list which closed last week quoted No. 1 R.R. heavy melting up $4 per ton at $45, Atlanta, but no sales were reported in the Birmingham district. Movement into dealers' yards, heavy before Christmas, has slowed down. The export market is quiet.

● **Houston**—The local mill returned to the scrap market after an absence of seven months and purchased a limited tonnage for January-February delivery. Mill brokers are quoting $39 for No. 1 heavy

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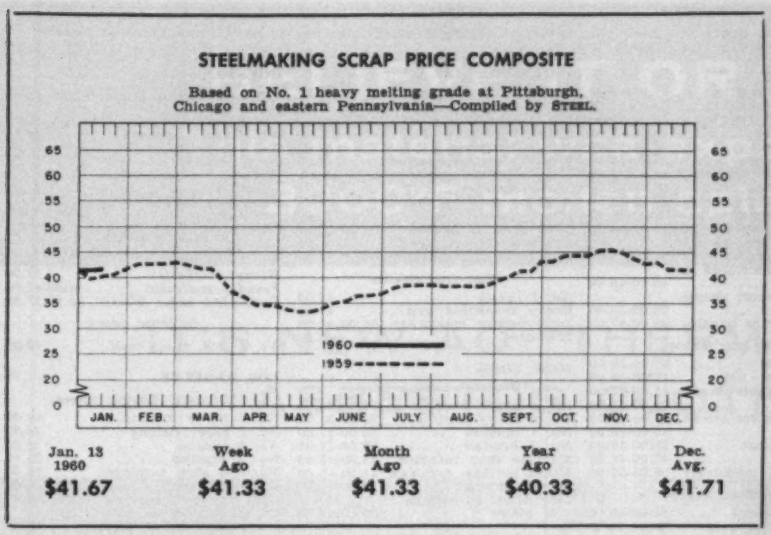


melting steel compared with the last sales price (June-July, 1959) of $34.

The Mexican mill at Monterrey also returned to the Texas market for a small tonnage with broker prices on the order pegged at $42-$42.50 for No. 1 grade.

Western Gulf export prices, excluding Houston where there is little activity, are quoted at $41-$42 for No. 1 heavy melting and $36 for No. 2.

The Texas cast market continues to weaken under pressure of meager buying. Broker prices declined $1 a ton for the second week in a row.

• **Los Angeles** — Though brokers and dealers are optimistic about 1960 being a boom year for the scrap industry, there is no sign of the upturn here as yet. Mills are doing limited buying, and prices are dropping. No. 2 heavy melting has dropped $2 to $36; No. 1 bundles, $1 to $36. No. 1 heavy melting is holding at $40 a ton.

• **San Francisco**—The steel scrap market is holding steady pricewise, with little chance of change soon.

• **Seattle** — Activity in the scrap market here is limited because buyers of large tonnages have big inventories. Substantial tonnages are being offered.

• **Portland, Oreg.**—The undertone of the local scrap market is weak, and prices may be lowered soon. Export demand has disappeared. The State Highway Commission has invited bids for the sale of structural steel from spans 5, 6, and 14 of the old interstate Columbia River bridge which has been rebuilt.

• **Washington**—Prices for iron and steel scrap in November lagged far behind the price of pig iron, latest figures published by the Bureau of Labor Statistics show. The bureau's indexes in November stood at 113.3 (1947-49=100) for scrap, 166.2 for pig iron, 186.8 for finished steel, and 166.4 for foundry products.

The Institute of Scrap Iron & Steel Inc. points out that the price of scrap was only 13.3 per cent above the average price in 1947-49, while the price of pig iron was 66.2 per cent higher. Finished steel and foundry items made from a combination of both products were, respectively, 86.8 per cent and 66.4 per cent higher.

Since compilation of the November index, scrap prices have dropped about $3 a ton on the basis of No. 1 heavy melting.

Pig Iron . . .

Pig Iron Prices, Page 125

Supplies of merchant iron continue ample. An adequate supply of domestic iron is supplemented by various offerings of foreign iron, averaging about $5 a ton under the domestic market.

In November, 27,700 tons were imported through the Philadelphia port against 9077 tons in October. Of the November imports, 10,800 tons came from Durban, South Africa; 9900 tons from Rotterdam, The Netherlands, and 7000 tons from another source not identified. Of the total, 17,800 tons appear to be for the account of Phoenix Steel Corp., Phoenixville, Pa.

Foundry operations are spotty. Now that the steel strike is out of the way and foundries are assured of larger orders for castings in the first six months, buying of pig iron will be done with more confidence.

(*Please turn to Page* 135)

Barringer Plans to Retire From Scrap Institute Post

E. C. BARRINGER, executive vice president of the Institute of Scrap Iron & Steel Inc., plans to retire in April after 21 years of service. He was president from 1942 to 1946.

Mr. Barringer was lauded for his "wisdom and tireless efforts" by Myron L. Chase, president of the ISIS, in his keynote address at the institute's 32nd annual meeting in Miami Beach, Fla.

Before joining the institute, Mr. Barringer was associated with trade papers in the iron, steel, and foundry industries. At one time he was managing editor of STEEL.

He served as a member of the War Department's Overseas Mission in Scrap in 1945 and has been a scrap consultant to the Bureau of Mines and National Production Authority.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Jan. 13, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 13	$41.67
Jan. 6	41.33
Dec. Avg.	41.71
Jan. 1959	40.58
Jan. 1955	34.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	36.00-37.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	*31.00-32.00*
No. 1 busheling	42.00-43.00
No. 1 factory bundles	51.00-52.00
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*23.00-24.00*
Shovel turnings	*31.00-32.00*
Cast iron borings	*31.00-32.00*
Cut structurals:	
2 ft and under	50.00-51.00
3 ft and under	49.00-50.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	54.00-55.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
Rails, 2 ft and under	*64.00-65.00*
Rails, 18 in. and under	65.00-66.00
Random rails	61.00-62.00
Angles, splice bars	*59.00-60.00*
Railroad specialties	*59.00-60.00*
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	41.00-42.00
No. 1 hvy melt., dealer	39.00-40.00
No. 2 hvy melting	35.00-36.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	25.00-27.00
No. 1 busheling, indus.	41.00-42.00
No. 1 busheling, dealer	39.00-40.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals, 3 ft	48.00-49.00
Punchings & plate scrap	50.00-51.00

Cast Iron Grades

No. 1 cupola	54.00-55.00
Stove plate	48.00-49.00
Unstripped motor blocks	46.00-47.00
Clean auto cast	60.00-61.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Angles, splice bars	54.00-55.00
Axles	58.00-60.00
Rails, rerolling	*62.00-63.00*

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	24.00-25.00
No. 1 bundles	*39.00-40.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*14.00-15.00*
Shovel turnings	*15.00-16.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Heavy breakable	39.00-40.00
Unstripped motor blocks	31.00-32.00
Charging box cast	39.00-40.00
Clean auto cast	52.00-53.00

CLEVELAND

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	47.00-48.00
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	44.50-45.50
Machine shop turnings	16.00-17.00
Shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	43.00-44.00
Cut structurals, plate 2 ft and under	50.00-51.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	47.00-48.00
Drop broken machinery	58.00-59.00

Railroad Scrap

R.R. malleable	64.00-65.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	57.00-58.00
Angles, splice bars	57.00-58.00
Rails, rerolling	74.00-75.00

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	36.00-37.00
No. 1 busheling	49.00-50.00
No. 1 bundles	46.00-47.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

BUFFALO

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	37.00-38.00
No. 2 bundles	27.00-28.00
No. 1 busheling	37.00-38.00
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	30.50-31.50
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	36.00-37.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast.	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	54.00-55.00

PHILADELPHIA

No. 1 heavy melting	42.00
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	47.00
No. 2 bundles	26.00
No. 1 busheling	47.00
Electric furnace bundles	49.00
Mixed borings, turnings	21.00-22.00†
Shovel turnings	*26.00-27.00*
Machine shop turnings	23.00
Heavy turnings	*31.00-35.00*
Structurals & plates	49.00-51.00
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grades

No. 1 cupola	*43.00*
Heavy breakable cast.	47.00
Drop broken machinery	54.00-55.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	35.00-36.00
No. 1 busheling	35.00-36.00
Machine shop turnings	11.00-12.00
Shovel turnings	15.00-16.00
No. 1 cast	39.00-40.00
Mixed cupola cast	37.00-38.00
No. 1 machinery cast	40.00-43.00

BIRMINGHAM

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	*25.00-26.00*
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	23.00-24.00
Shovel turnings	25.00-26.00
Bar crops and plate	44.00-45.00
Structurals & plates	43.00-44.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	39.00-40.00
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
Rails, 18 in. and under	56.00-57.00
Rails, rerolling	61.00-62.00
Rails, random lengths	52.00-53.00
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00
No. 2 bundles	25.00
No. 1 busheling	42.00
Machine shop turnings	19.00
Shovel turnings	21.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	46.00
Heavy breakable cast.	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00
Rails, 18 in. and under	56.00
Rails, random lengths	50.00
Rails, rerolling	65.00
Angles, splice bars	50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*36.00*
No. 1 bundles	*39.00*
No. 2 bundles	*25.00*
Machine shop turnings	*19.00-20.00*
Shovel turnings	*23.00*
Low phos, plate & structurals	*46.00-47.00†*

Cast Iron Grades

No. 1 cupola	*45.00-46.00†*
Heavy breakable	*33.00*
Foundry malleable	*41.00-42.00*
Unstripped motor blocks	*36.50-37.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00*

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	40.00
No. 2 heavy melting	*36.00*
No. 1 bundles	*36.00*
No. 2 bundles	21.00
Machine shop turnings	18.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	25.00
Shovel turnings	22.00
Electric furnace bundles	42.00-44.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	*25.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00
No. 1 bundles	32.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	42.00-43.00

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast.	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast.	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades†

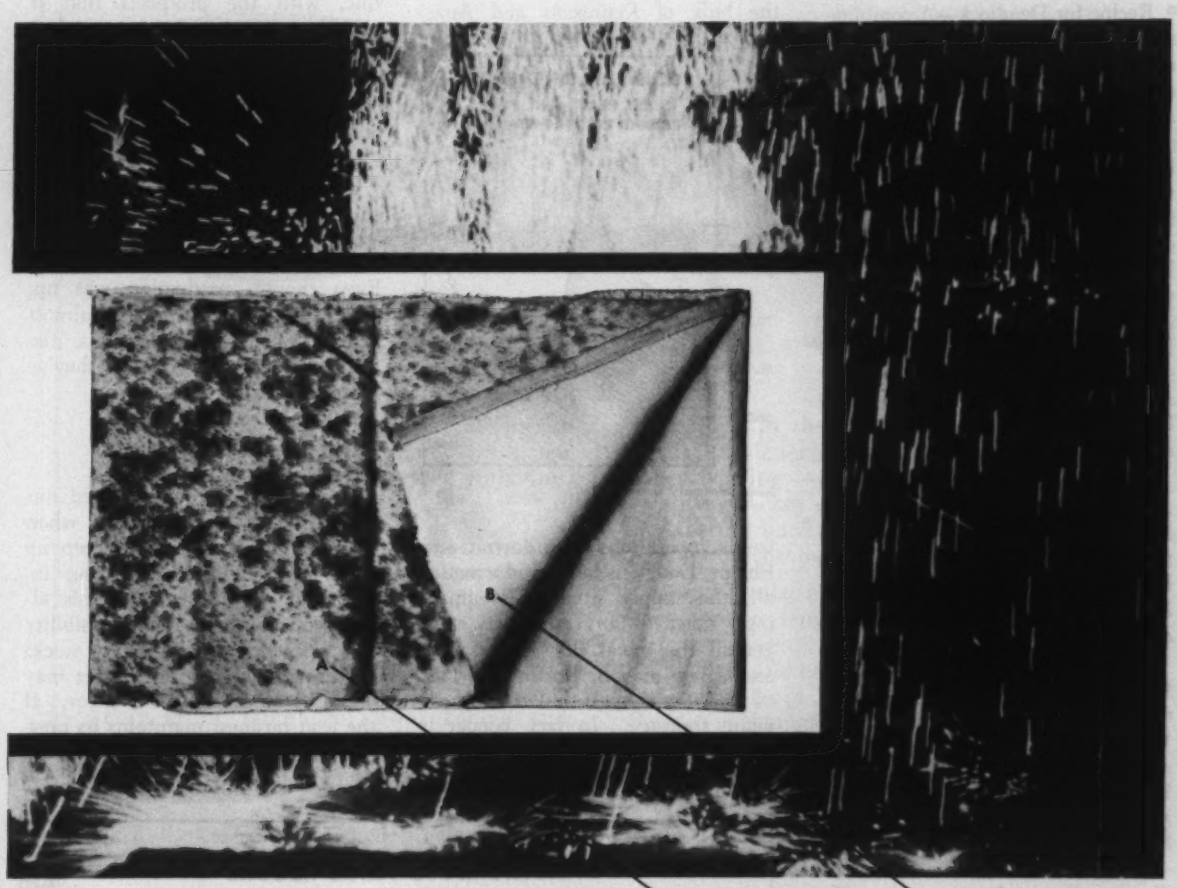
No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

BELIEVE IT OR NOT...

This material was exposed to 3000°F molten splash!

IT'S NEW AO "THERMOGARB" ASBESTOS CLOTHING



A Here's the *outer* side of the material which was directly exposed to the molten splash at a distance of 8 feet from the pour.

B Here's the *inner* or wearer side of AO Thermogarb. After 42½ minutes of splash exposure there's no burning through or penetration, no scorching, not even a blemish.

AO Thermogarb is a NEW *lightweight* asbestos cloth. A 30-inch length coat weighs approx. 3¾ lbs. as against conventional asbestos coats of 6½ lbs. — or approximately the same weight as aluminized asbestos coats of the same length. This completely field-tested material is available in a complete line of body protection for high heat — molten splash protection. Your nearest American Optical Safety Products Representative can supply you.

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Always insist on AO Trademarked Safety Products

Unions Balk, Stall Copper

Local issues have brought a virtual halt to copper negotiations which appeared ready for settlement several weeks ago. Zinc price upped to 13 cents

Nonferrous Metal Prices, Pages 134 & 135

THE COPPER STRIKE is entering its sixth month with a big chunk of the domestic industry still closed down and no immediate settlement in sight.

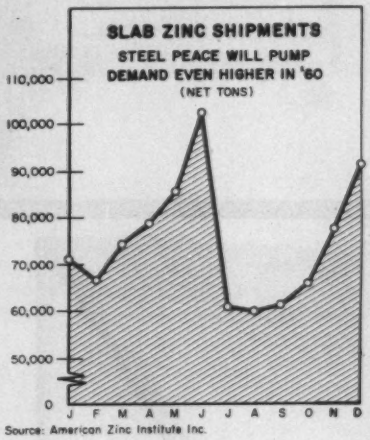
• **Recipe for Deadlock**—A combination of many things is holding up a settlement, even though the aluminum and steel negotiations are all wrapped up, say labor relations people. For instance, the industry has to deal with a multitude of unions, each with its own pet goals, its desires to get more than another union, and its fears of losing membership to a rival organization. Add union fears of automation and the feeling of union brass that they have to entrench their positions to show how tough they can be with management. Mix well and you have an atmosphere not too conducive to bargaining.

Finally, there's the economic side of the contract. While settlements have pretty much fallen into a pattern, companies complain the unions haven't taken into account the varying conditions that exist from producer to producer.

• **Some Settle, Some Don't**—So because of one or more of those factors, we've come to the strange situation where part of the workers in a company may have signed a new contract while the others still hold out.

Take the case at Kennecott Copper Corp., for example. The company signed with the United Steelworkers of America in November, then had to negotiate until late last month to win peace with the other big copper union, the International Union of Mine, Mill & Smelter Workers. Yet, even with the bulk of its employees signed up, Kennecott currently is able to turn out only about 10,000 to 12,000 tons of refined copper a month, about one-third of its capacity. That's because a handful of unsigned craft unions are holding up production at other facilities in the probable hope of winning some type of preferential treatment.

• **No Acute Shortage**—Even though the bulk of Kennecott and Anaconda operations are down, and Phelps Dodge is not producing at all, the supply situation is amazingly good. Many customers can't get all the metal they would like, and a few may be hurting for lack of specific shapes, but there's no acute shortage. In fact, copper is available from dealers for January delivery at 37.5 to 38 cents a pound because of the reluctance of many users to pay this premium.



Source: American Zinc Institute Inc.

Copper will continue to be short until several months after the strike bound companies are back into operation. The pinch may become a little more severe as the settlement in steel accelerates the whole manufacturing picture. It's unlikely, though, that you'll see a really serious shortage.

Zinc Prices Upped

A continued strong demand for zinc, with the prospects that it will become even stronger, sparked an increase of 0.5 cent a pound to 13 cents on Jan. 8. Most producers also bumped the premiums on high grade and special high grade by 0.25 cent a pound.

The December statistics showed shipments of slab zinc hit 91,404 tons, the best month since June and the second best of the year. Even though production was up, producers' stocks tumbled almost 22,000 tons to 154,419 tons, the third straight month they've dropped.

Lead Sales Rolling

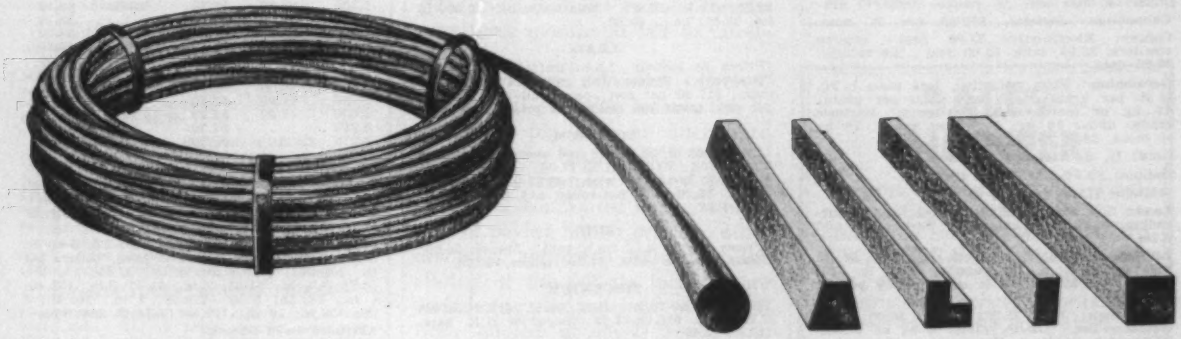
Lead seems to have entered another one of those periods when it's tough for salesmen to keep up with the new orders pouring in. A deluge of business like this always raises the strong possibility of a price rise, but the heavy stocks overhanging the world market may prove to be a tempering factor. If the lead business maintains its present pace, look for a bump of 0.5 cent a pound.

NONFERROUS PRICE RECORD

	Jan. 13 Price	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	25.300	24.700	24.700
Copper	33.00–35.00	Dec. 23, 1959	33.00	33.269	32.420	29.212
Lead	11.80	Dec. 21, 1959	12.30	12.338	12.800	12.415
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	99.50	Jan. 13, 1960	99.375	99.130	100.985	99.409
Zinc	13.00	Jan. 8, 1960	12.50	12.500	12.500	11.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

RELIANCE
COLD FINISHED SPECIAL STEELS



When you write your specifications for Cold Finished Steel, you know what you want. When Reliance does the finishing, you get what you specify.

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Reliance Cold Finished Steels are used exclusively in the Eaton-Reliance line of quality fasteners. We produce ball and roller bearing — keystone — cold heading — spring — key — pin — and other items of exacting quality. Let us help cut your production cost with fine quality steels.

Our mills also produce coils and straightened-and-cut lengths in rounds, squares, flats and special sections — cold drawn, cold rolled, and centerless ground — ranging in size from .020" x .020" to ½" x $\frac{9}{16}$". Besides carbon steel, you may also specify stainless, alloy, other nonferrous metals, and expect the same high quality.

Write for our Engineering Bulletin on Eaton-Reliance Cold Finished Steels.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60; 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $22-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 99.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special 13.25; intermediate, 13.50 East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.25-14.50; special high grade, 14.50-14.75 deld. Diecasting alloy ingot No. 3, 16.25-16.50; No. 2, 16.75-17.00; No. 5, 16.50-16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, maganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 alloy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.75; grade 2, 24.50; grade 3, 23.50; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 33.98. Weatherproof, 20,000-lb lot, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Sealmless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy		Plate Base	Circle Base
1100-F,	3003-F	44.60	49.40
5050-F		45.70	50.50
3004-F		46.70	52.40
5052-F		47.30	53.10
6061-T6		47.80	53.90
2024-T4		51.80	58.90
7075-T6*		60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-1.210

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 20.25-20.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54. 6c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippins, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.50-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper, 23.50; refinery brass (60% copper) dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 25.50; light copper, 23.50; No. 1 composition borings, 22.25; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.75; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 20.25-20.50; flat tops, 20.25-20.50; flats, 23.00-23.25; ovals, 22.25-22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (Anhydrous): 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90.

Stannous Sulphate: Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 129)

Foundries in western New York expect to ship about 10 per cent more castings in 1960 than in 1959, a survey indicates. This should be reflected in a similar increase in demand for merchant iron in that area.

Except for textile mill equipment foundries, gray iron shops in New England are coming back slowly from the late 1959 slump.

Indications are that pig iron shipments will be a little heavier this month than in December. Automotive and other captive foundries are operating at a fast clip, but jobbing shops are lagging and consider their business outlook for the next three months as fair to uncertain.

Mystic Iron Works, Everett, Mass., will sell the balance of its stockpiled pig iron at unchanged prices on the basis of $68, furnace, for No. 2 foundry. Many former customers, confronted with the prospect of paying higher prices to other domestic suppliers following the closing of the Mystic furnace, are considering the purchase of foreign iron, quoted at levels under the Mystic price.

Canadian Ore Developed

British Columbian interests are developing iron ore properties to feed blast furnaces in Japan. Iron ore and concentrate shipments from Canada's west coast are about $7

SALE OF

U. S. AIR FORCE PROPERTY

BY SEALED BID

SPECIAL TOOLS AND TEMPLATES

TO BE SOLD AS SCRAP

LOCATED AT

KAISER FLEETWINGS, INC.

BRISTOL, PENNSYLVANIA

SOLD IN LOTS AS FOLLOWS:

LOT #1 CONSISTING OF APPROXIMATELY 18,000 POUNDS STEEL AND APPROXIMATELY 2,000 POUNDS MISCELLANEOUS

LOT #2 CONSISTING OF APPROXIMATELY 4,800 POUNDS KIRKSITE AND APPROXIMATELY 1,275 POUNDS STEEL

FOR BID LETTER AND INSPECTION CONTACT: WILLIAM C. HEILBRUN

KAISER FLEETWINGS, INC.

BRISTOL, PENNSYLVANIA

Phone Stillwell 8-8431 Ext. 179

BID OPENING: January 20, 1960 at 2:00 P.M.

SALES ENGINEER

Progressive nation-wide Engineering-Construction firm requires the services of a qualified ENGINEER-SALESMAN to contact and sell engineering and construction services to principals of steel producing companies.

Applicant should have a background of steel plant engineering and/or operating experience. Sales background and a wide acquaintance with engineering, operating and procurement officials of the steel industry is desirable.

Assignment of successful applicant will be

IN CHICAGO

where he will enjoy generous life insurance, free family health plan, retirement benefits, moving expenses and other perquisites.

All applications will be acknowledged and held in strictest confidence. Submit detailed resume of experience including references and salary requirements to:

Box 819, STEEL
Penton Bldg., Cleveland 13, Ohio

CLASSIFIED

ACCOUNT WANTED

Have represented two concerns, fastener and perishable tool manufacturers, in North and Western Ohio for past ten years. Call on wholesale hardware, jobbers and industrials. Could devote considerable time to additional non-conflicting line in whole or part of mentioned area. Reply Box 820, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

PLANT SUPERINTENDENT for Structural Steel, Fabricating and Erection Company-20,000 ton capacity. To take complete charge of fabrication of structural steel for commercial, institutional and industrial buildings in Eastern States. Minimum requirements five years experience supervising shop employing approximately 100 personnel. Send complete resume, listing all employment, experience, education and salary requirements. Box No. 821, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 45, graduate, 20 years tube mill plant and project engineering; including design, specifications, forward planning, and new construction. Desires responsibilities at departmental or corresponding administrative level. Reply Box 822, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $18.00, each additional word .36; all capitals, 50 words or less $21.00, each additional word .45; all capitals leaded, 50 words or less $25.00, each additional word .55. "Position Wanted" set solid, 25 words or less $5.00, each additional word .20; all capitals, 25 words or less $6.50, each additional word .26; all capitals leaded 25 words or less $8.00, each additional word .32. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

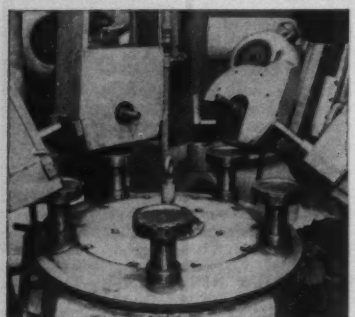
OSBORN®

BEFORE BRUSHING—Clutch back-up plate has sharp edges . . . carries fine chips and burrs inside teeth.

AFTER BRUSHING—Edges and surface junctures are uniformly precision blended. Chips and burrs are thoroughly removed to help assure troublefree performance.

Auto maker races to a perfect finish

. . . cleans, blends 450 parts-per-hour with OSBORN Power Brushing



4 POWER BRUSHING HEADS plus a 6-station index table setup produce a quality finish for automotive clutch parts. Osborn Monitor® Brushes — working at 1750 rpm — automatically deburr and blend 450 parts-per-hour in this low-cost operation.

THESE clutch back-up plates—product of a leading auto manufacturer—are quality finished at high production rates with versatile, low-cost Osborn Power Brushing.

The job requires blending sharp edges and surface junctures of the intricately shaped parts . . . plus thoroughly removing fine metal chips and burrs that could later cause trouble in the clutch assembly. *This Osborn rotary power brushing setup does the entire blending and deburring job rapidly, uniformly, economically. Rate: 450 parts-per-hour.*

Low-cost precision finishing like this can be applied to many types of products you build today. An **O**sborn **B**rushing **A**nalysis — made in your plant at no cost or obligation—can pinpoint where *you* can speed production . . . improve quality . . . cut costs with modern power brushing methods. Write or wire us for details. *The Osborn Manufacturing Company, Dept. S-17, Cleveland 14, Ohio.*

Osborn Brushes

METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

million annually. Contracts over the next three years gross about $30 million.

There is a possibility that development of new properties together with research in Japan may more than double the export totals within the next few years. Without the Japanese market, there would be little or no exploitation of iron ore deposits in British Columbia.

Companies exporting to Japan include Texada Mines, which produced about 300,000 tons in 1959; Empire Development Ltd., which has closed a contract for 1.4 million tons of concentrate over the next three years; Hualpai Enterprises Ltd., which produced about 15,000 tons of ore last year, and Nimpkish Iron Mines Ltd., which has entered into an agreement to deliver 1,050,000 tons. All iron ore properties are on Vancouver Island.

Distributors . . .

Prices, Page 125

Stocks of steel held by service centers still show wide gaps. That is especially true in sheets and in a slightly lesser measure in wide flange beams. Of the major grades, plate inventories appear to be in best balance. Distributors are pressing mills for shipments to replenish their stocks, especially in the galvanized and cold finished categories.

Rails, Cars . . .

Track Material Prices, Page 123

The Atchison, Topeka & Santa Fe plans to spend $100 million for new equipment and capital improvements. That's $13 million higher than the previous record and compares with an outlay of $60 million in 1959.

The expenditures will be about equally divided between new equipment and improvements to roadways and other facilities.

The road will acquire sixty, 2400 hp, diesel-electric locomotive units and 50 baggage cars, some of which are already in production schedules.

Among other capital improvements are 227 miles of heavier, continuously welded rails; construction of a freighthouse at Kansas City, Mo.; and consolidation of freightyard facilities at Brownwood, Tex.

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if HEAT is YOUR PROBLEM call ROLLED ALLOYS. for RA 309 RA 310 RA 330

IN STOCK—
IMMEDIATE DELIVERY
Send for Stock List or Literature

ROLLED ALLOYS, INC.
Heat and Corrosion Resistant Alloy Specialists

5307 Concord Avenue • Detroit 11, Michigan
333 William Street • South River, New Jersey

Work with your AIM*. . . Wire Sales Company does . . .

Powered Stretcher makes coil strapping easier

WIRE SALES COMPANY, CHICAGO, ILLINOIS, sought to develop a faster, easier method of strapping heavy coils of wire.
Their Acme Idea Man recommended an Acme Steel B1P Pneumatic Stretcher for use with heavy-duty steel strapping. (Idea No. U6-33)

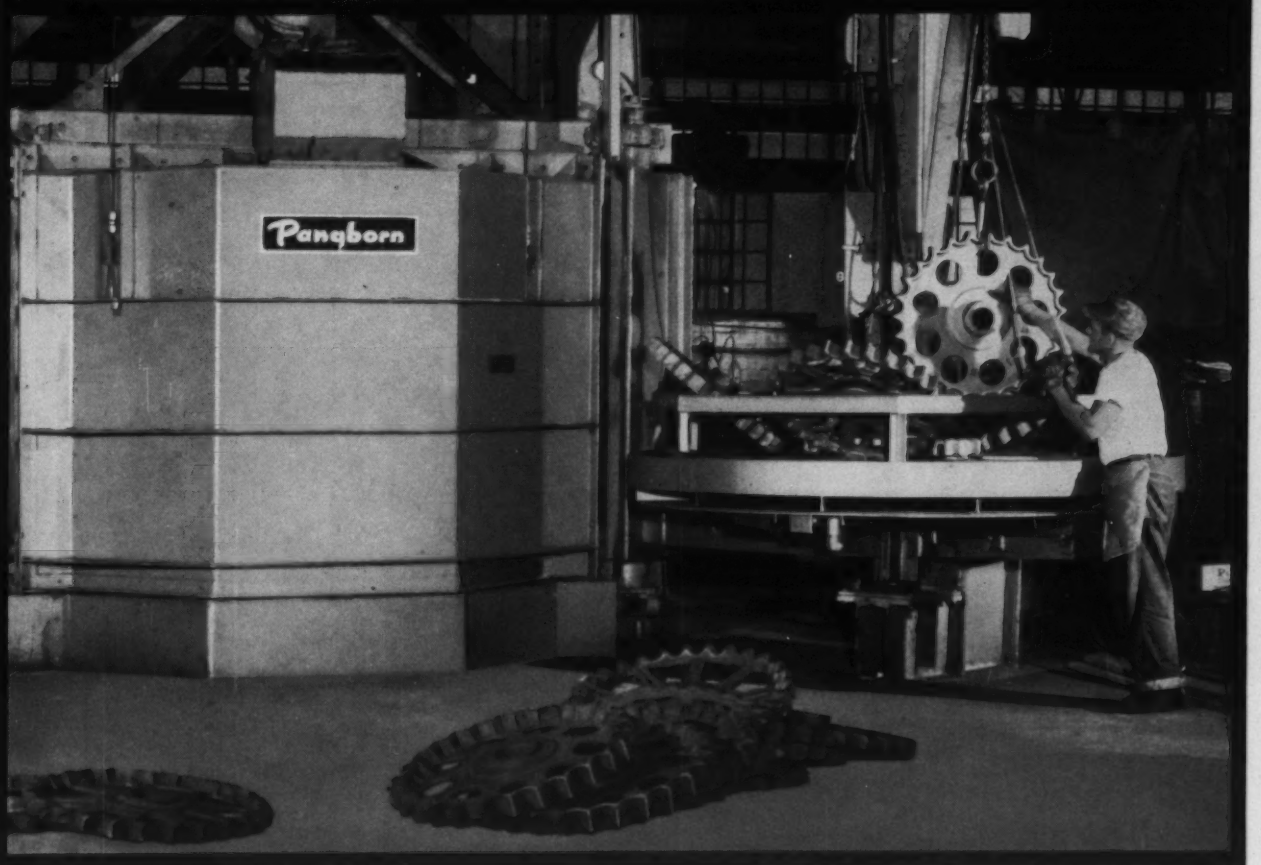
Acme Idea Man Gene Fairbank helps many companies set up better, more economical packaging and material handling.

Result: each and every strap applied is of the same, uniform tension. This user feels that this is the most practical way of tieing large coils of wire weighing 2000 to 2300 lbs. each. The pneumatic-powered B1P can be set to deliver a pre-determined tension that pulls bundles to exactly the tightness and compactness desired. It eliminates operator fatigue as a reason for loose strap ties.

***Work with your Acme Idea Man** to improve your packaging and handling problems. Write Dept. SDU-10, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Limited, 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

DOUBLES CLEANING CAPACITY!



Pangborn Table Room does twice the work at Harrison Steel Castings!

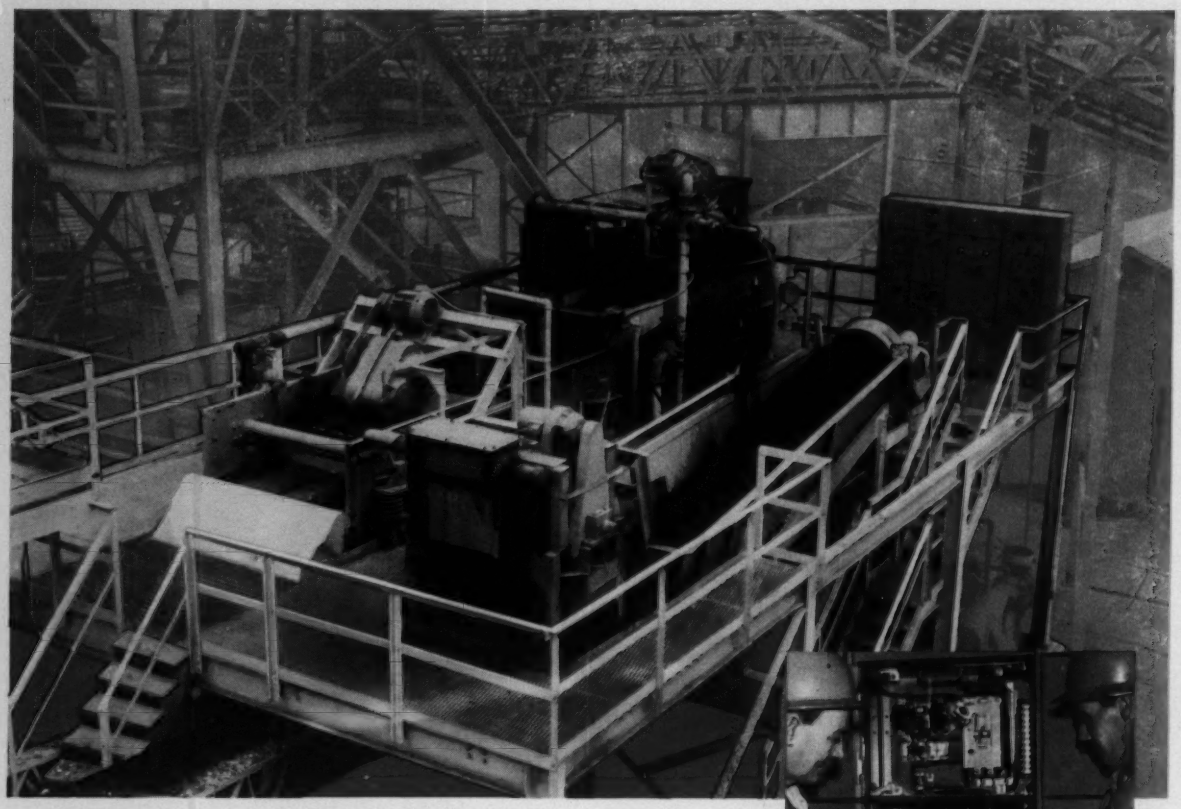
Two basic features of the new Pangborn "LM" Table Room at Harrison Steel Castings Co., Attica, Ind., explain the firm's doubled capacity in the cleaning department.

First: *Twin* work tables—one rotating in the blast cabinet while the other is reloaded—clean pieces up to 8′ diameter continuously. These tables handle smoothly . . . are easily pushed by hand. Their weight while loading is supported by a stationary floor pedestal (rather than door hinges) for long life and trouble-free operation.

Second: The "LM" Table Room utilizes two Rotoblast wheels throwing a total of 100,000 lbs. of abrasive per hour. The result is a tremendous concentration of blast power for quick cleaning . . . positioned for complete, thorough work coverage.

The cleaning speed and operating ease of the Pangborn Table Room have proved the value of this machine at Harrison Steel Castings. If *you* must maintain production schedules in cleaning large, awkward or heavy pieces, send for Bulletin 805. Write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

Pangborn Cleans it fast with **ROTOBLAST**®



Versatile WEMCO HMS Mobil-Mill

Fully Equipped with Cutler-Hammer Unitrol®

Unitrol control units are easily installed ... exclusive plug-in connector eliminates hazardous manual adjustments. Locked test position assures safe inspection and maintenance.

Western Machinery Company's WEMCO HMS Mobil-Mill has gained widespread recognition and preference by demonstrating its broad versatility, rugged dependability, and low capital investment per ton of capacity. Both metallic and non-metallic ores and minerals, gravels, coal, etc. can be *continuously* extracted from the unwanted material with minimum operating costs and attention. Ranging in sizes from 5 to 500 tons per hour capacity, WEMCO Mobil-Mills have performed successfully as complete production plants, pre-concentration units, and pilot plants.

To assure maximum flexibility and trouble-free performance of the electric motor driven equipment under all operating conditions, WEMCO Mobil-Mills are equipped with Cutler-Hammer Unitrol as standard original equipment. This compact control center cuts job-site wiring time and costs. Modular construction permits rapid alterations of the control units to keep pace with changing mill requirements. And vertical *dust-safe* contacts, indestructable molded magnet coils, and optional full three-phase 3 coil overload protection are typical plus features of Unitrol which guarantee unsurpassed performance and dependability.

For prompt attention to your control requirements write Dept. A213, Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

CHOICE OF THE LEADERS

CUTLER-HAMMER CONTROL C-H

THE MARK OF BETTER MACHINES

CUTLER-HAMMER

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